Technology and Urban Planning: Conditions, Market, and Guidelines

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of the Requirements for the Degree
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by

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Overview

The following is an assessment of technology's impacts, influence, and implementation in the field of planning. The report discusses 1) the nature of civic technology industry, 2) current planning technology market conditions, 3) responses from public planning professionals, and 4) strategies for tech implementation in public agencies. A combination of research and outreach provides insight into the industry, and aims to encourage innovation in the field. The information is divided into four main sections, and has resulted in the following material.

In Part I, the connection between technology and planning is developed through examination of trends and data in both industries. The section comprehensively defines civic technology, provides research, and describes its objective in planning. The information provided in Part I serves as the foundation for the scope of outreach and formation of the guidelines.

In Part II, a survey conducted to provide a general understanding of the planning technology market is analyzed. The survey discusses how planning technology aligns with observations and trends in the tech industry in general. The analysis provides a limited market assessment of planning technologies, and develops insight into the demands and support for civic innovation in planning. Many of the topics and findings discussed advance the examinations in Part I. A summary of the findings in Part II is provided on pg. 21.

In Part III, results from a survey of planners in their public capacity is provided in narrative form. The purpose of the narrative is to serve as a quasi-roundtable discussion on technologies from a professional planning perspective. The topics discussed reveal general attitudes toward tech implementation, common strategies, and observation of tech integrtion in planning practice. The outreach is limited to 20 respondents from a diverse range of cities. A summary of the findings in Part II is provided on pg. 27.

In Part IV, observations and information in the previous sections guides the development of the planning technology implementation guidelines. The guidelines discuss the key principles, and strategies recommended for better tech utilization in public planning agencies. The information provided in this section influences the practice of government agencies, and, ultimately, urban planning—as technology becomes more present in the field. These changes may prove beneficial to planning agencies attempting to better use planning technology, or increase its utilization in their community.

Collectively, the report explains the relationship between technology and planning, analyzes the survey of information collected on both industries, and guides the future implementation of planning technology. The use of planning techinfluences new developments in the field that will affect many professionals and organizations in the near future. The following conditions report, market analysis, and guidelines aim to explain and assist in the rapid innovation.

1.1 Introduction:

A decade of rapid industry advancements for both technology and urban planning has resulted in a co-development of tech-based products and strategies anticipating to solve a number of urban issues. The following report is a combination of research and discussion regarding current trends, data, and observations of the emerging tech submarket, and its increasingly important connection to the field of urban planning. The following narrative will include an assessment of the tech industry as it relates to government planning, an analysis of current planning technologies, discussion from the perspective of planners, and results in guidelines for implementing technology into planning agencies. The sections will be separated in to four parts with Part I being an overview of the relationship between technology and planning.

1.2 Civic Technology Defined:

The term "civic technology" is not concretely defined, however, commonalities can be drawn from a variety of interpretations provided by professionals and analysts. For example, a collaborative report from Accela, a leading "civic tech" provider, and International Data Corporation, a tech-focused market intelligence organization, defined civic technology as "merge[ing] technology innovation with civic purpose [to connect the general public] with government services and government workers to make civic engagement and government infrastructure more effective" (2015). A simpler, interpretation from the Omidyar Network, a philanthropic investor for social change, defined civic technology as, "any technology used to empower citizens or help make government more accessible, efficient, and effective" (2016). A clear focus on the connection between the two entities and aim to improve it. Lastly, the Knight Foundation, a leading investor in civic technology, describes "civic tech" as "technologies designed for the health and vitality of cities" (2013). These definitions characterize a progressive relationship and venture between technology, government, and the general public. The main ideas drawn from these interpretations demonstrate the importance of citizen interaction with their government, and the importance of increasingly effective and well-equipped public services. Civic technology has been defined as having three key roles ; receptive, interactive, and transactive (Riggs & Gordon, 2016). Therefore, civic technology is ultimately defined by its aim to empower, connect, and make efficient urban communities through the development of technology that distributes information, engages community stakeholders, and facilitates efficient exchange of services and products.

In regards to the research and discussion to follow, the term "civic technology" represents the industry and social movement aimed to transform public engagement and governing bodies for the advancement of the commonwealth within urban communities through the means of technological innovation. Conjointly, the expression "civic tech" will distinguish the products and services.

1.3 Civic Technology as a Social Movement:

"Social movements—large-scale, collective human activity aimed at producing changes in society" (Omidyar Network, Purpose, 2016).

The concept of civic technology as a social movement may be an abstract notion, however, the citizenry is the key user and stakeholder in the civic process. Therefore, a strong familiarity with social trends and community action is an important aspect understanding of the development of a common vision and objective for technologies among urban communities. In a joint report by the Omidyar Network and Purpose, six definitive criteria of a social movement were recognized and connected to trends in civic technology—scale and growth, grassroots action, sustained engagement, shared vision, collective action, and shared identity (2016). In summary of the report, civic technology has achieved a significant amount of purposeful activity from a committed community across the United States. The community behind civic tech is largely concentrated in the nations tech-hubs, engaged primarily through media outlets—such as Twitter—and meetups through organizations like Code for America and GitHub that crowdsource coding and raise funing for development of new civic tech (Omidyar Network, Purpose, 2016). However, Omidyar Network unfortunately reports the movement's inconsistent vision caused by a diverse identity with a range of terminology not commonly used in the sector (2016). Ultimately, civic technology, as a social movement, has formed an active and engaged community, but remains ambiguous in identity, vision, and inclination.

In regards to the social aspects of civic technology, it is important to note the industries considerable influence over the development of social capital and civic engagement. Civic technology intends to strengthen citizens' knowledge and participation in the civic process—similar to Jeffersonian Democracy favoring the role of individuals rather than elites—through an increased production of political efficacy and emphasis on government transparency (). In some ways, the advancement of civic technology is a movement demanding the increase of social capital promised by new technological development. Increased access to information online continues to produce obtainable and effective civic capacity. Aside from web-based technologies, Jennifer Evans-Cowley emphasizes the growing importance of mobile technologies, and growing capabilities of people to receive information, collect information, and engage with one another, as they interact with their surroundings, in real-time (2010). An increased ability to educate oneself on their political, environmental, and social surroundings. Civic technology is a diverse industry with emerging stake in modern social construction, and produces an assortment of technologies serving an ever-growing demand from people to participate in their communities.

1.4 Civic Technology as a Growing Industry:

Although it remains unclear whether civic technology is experiencing significant growth as a social movement, from 2000-2012, the civic tech industry, originally comprised of 16 companies, has experienced an average 23% compounded annual growth rate (CGAR), and now consists of over 121 compa-

nies (Gourley, Houghton, Patel, and Sotsky, 2013). Similarly, the International Data Corporation reports a $6.4-billion evaluation of the civic technology market, which was growing 14 times faster than traditional information technology, likely, a result of from State and Local investments, totaling $25.5-billion in 2015, and additional $431-million in private and philanthropic investments (2015). According to the Knight Foundation's report, the vast majority of this funding came from private investments with nearly 50% of the proposed civic tech projects from 2011-2013 receiving investment (Gourley, Houghton, Patel, and Sotsky, 2013). Ultimately, civic technology is a minor, however, rapidly growing industry with increasing interest from for-profit companies and investors, non-profit companies and investors, and government agencies. All of whom are observing a need for new types of civic technologies, and an opportunity for them to be successful.

In order to better understand the diverse and complex typologies of civic technology beyond its general growth and viability as an industry, it is imperative to understand the variety of civic tech and existing subcategories. The following are fields, services, and clusters of civic tech typologies taken from the Knight Foundation and International Data Corporation's reports:

Fields: (Knight Foundation, 2013)

- Government Data: Public data access and transparency.
- Community Organizing: Social causes, and civic engagement.
- Social Networks: Place-based networks and community forums.
- Crowd Funding: Funding for projects that enhance public services and spaces.
- Collaborative Consumption: Peer-to-Peer sing of resident-owned goods and services.

Services: (International Data Corporation, 2014)

- Data Access and Transparency
- Public Decision Making
- Resident Feedback
- Visualization and Mapping
- Voting and Legislative Process
- Community Action and Crowdsourcing

Clusters: (Knight Foundation, 2013)

- Open Government
- Data Access and Transparency
- Data Utility
- Public Decision Making
- Resident Feedback
- Visualization and Mapping
- Voting
- Community Action
- Civic Crowdfunding

- Community Organizing
- Information Crowdsourcing
- Neighborhood Forums
- Peer-to-Peer Sharing

In summary of the Knight Foundation's investment analysis by typology, 1) "Community Action" received more investments from individual and financial investors than "Open Government", 2) "Peer-to-Peer Sharing", "Neighborhood Forums", and "Community Organizing" received the largest amount of funding, 3) "P2P Sharing", "Community Organizing", and "Resident Feedback" had the most associated companies, and 4) "Civic Crowdfunding", "Voting", and "Data Utility" had the least amount of associated companies (Gourley, Houghton, Patel, and Sotsky, 2013). Collectively, observations of the two reports find several different stories. Firstly, current investors and people place a higher value on companies associated with "Community Action" than those associated directly with government efficiency and transparency. Secondly, open government technologies are funded primarily by grants, which often do not provide as much funding as private investors. Finally, there may be opportunity for companies focused on open government technologies to develop strategies to attract greater private investors (Gourley, Houghton, Patel, and Sotsky, 2013).

In comparison, Riggs and Gordon (2016) distinguish the "taxonomy" of civic technologies using definitive "meta-characteristics" indicative of planners' interaction with the technology, rather than, the hardware or software itself. By doing so, categorizing technologies by planning function, and their influence over the flow of information through the planning processes. In sum, this taxonomy structure better understands how the user, planners in this case, uses the technology, as opposed to, objective classification of the its purpose (Riggs & Gordon, 2016). The following are descriptions of the taxonomies identified by Riggs and Gordon:

Informational: [Technologies] which makes information more widely available to planning professionals.

Transactional/interactive: [Technologies] that allow citizens to participate and share their input on a variety of planning activities and projects.

Utility/productivity: [Technologies] that offer some type of tool or project management platform to support planning workflow efficiency.

Virtual reality/gaming: [Technologies] involving a computer generated simulation of an image or environment, which help make complex scenarios more clear.

Wayfinding: [Technologies] that collect data on citizens" navigation habits, including orientation, route decisions, route monitoring, mode of transportation, and route times, which improve the effectiveness of those services.

1.5 Civic Technology Aimed to Transform:

As noted prior, civic technology facilitates a co-transformation of public welfare and government function, and one of the primary outlets for public and government interaction is urban planning process at the state and local levels. This section will demonstrate the transformative nature of civic technology, and begin to emphasize the urban planning sector and "planning technologies"—or civic technologies closely associated to the urban development, plan development, and community development in urban areas.

An Aim for Better Public…

As progressively more industries and activities digitalize, demands and expectation for high-functioning government services and processes is continually rising. More specifically, citizens will no longer tolerate lengthy town meetings, outdated paperwork, and face-to-face interface with bureaucracy (Ruthbea ,Yesner, Clarke, 2014). According to the International Data Corporation, the public-government relationship paradigm will shift toward increased 24x7 access services, web and mobile access, social networking, increase in urban-focused mobile applications, and access to transparent open data (2015). The observations of the IDC report are consistent with survey information collected by the Pew Research Center—nonpartisan fact tank focused on social science research.

Interestingly, the Pew Research Survey revealed three insightful conclusions about the technological relationship between government and the general public; 1) increased youth participation in the use of open government data released by state and local governments, 2) an increased willingness for community members to contribute to open data that does not ask about sensitive information, and, less optimistically, 3) the general public's perception of "little efficiency" of government at any level (Horrigan, Rainie, Page, 2015). Additionally, the survey illustrates the citizens' negative tendencies toward being "light users" of government data, and, more importantly, tendencies toward pessimism regarding government function and transparency (Horrigan, Rainie, Page, 2015). Therefore, civic technology should serve to spur growth in civic participation via digital platforms, and decrease any negative perception of government efficiency.

An Aim for Better Government…

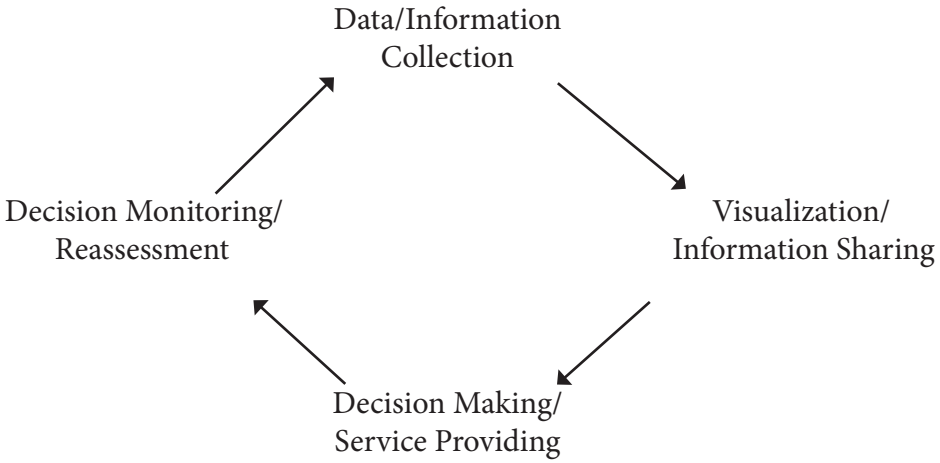
Civic technology, as a growing social movement, shall serve to increase community action, grassroots activism, and civic engagement. Therefore, it is important for the tech industry to consider the user, the community members served by planners, in creating technologies that allow government to better interact with its public. Ultimately, it is the interaction users have with government allowing for improved governance through technology. As an industry, if civic technology were to go "mainstream", available technology would expand to meet a growing market aimed to improve government efficiency, and serve the general population. Civic technology will develop products and services for governing bodies whose aims are the general welfare of urban communities. Therefore, with increasing investment from both public and private sources of capital, civic technology is, and will continue to be, a truly noble industry. The advancements attributed to civic technology are apparent in all departments of public service.

An Aim for Better Data and Social Equity…

Civic technology, specifically planning technology, aims to meet society's growing demand for e-governance. According to the Pew Research Center, 64% of U.S. citizens own smartphones (Smith, 2015), which, ultimately, provides the public increased ability to access and contribute data regarding their interaction with urban environments and government (Riggs, 2016). In meeting these requests for data accessibility and equity, civic technology will demand planners to anticipate changes in citizens interaction with their surroundings. As discussed prior, civic technology will advance resident social capital through increased information sharing at real-time speeds, and inevitably improve the capacity to participate in the planning process. Government will be expected to react to increased efficacy, and provide citizens with the means to engage in civic processes. Despite these advancement opportunities, technology is limited by planner and citizen capacity to use, acquire, and maintain the infrastructure and support necessary to reap its benefits (Ray, 2011, Fernback and Schaffer, 2010). In sum, increased data equity from improved ability to share information via tech will advance the productivity of both citizens and planning staff. Ultimately, leading to greater social and political efficacy in government and planning.

An Aim for Better Planning…

The progress and achievements of civic technology are accurately manifested in both the technical and political processes of urban planning. Urban planning is a public-private process that employs civic participation and technical modeling/forecasting to deliver thoughtful services and decision-making. As a result, urban planning is a key consumer of civic technology in all aspects of the process; defined by this report as, Data/Information Collection, Visualization/Information Sharing, Decision-making/Service Providing, and Monitoring.



Data/Information Collection

The urban planning process begins primarily as a bottom-up political process in which citizens or business owners provide information to government officials requesting certain services or political decisions. It is a collaborative system between data providers and data users. In response, some planning technology aims to provide an accessible digital platform to facilitate participation in information systems,

and/or conjoin the roles of users and providers (Hanzl 2007). Overall, planning technology facilitates participation during data/information collection aspects of the urban planning process on both fronts; information sharing and stakeholder interaction (Evans-Cowley & Kitchen, 2011). Increasing use of web-interface has given civic technology an opportunity to generate and absorb civic participation and transaction on web-based platforms. For example, permit technologies, such as the ones provided by Accela, allow for transaction interactions between public applicants and government officials. Similarly, mobile technology has allowed for citizen participation to be constant, reliable, and on-the-go.

Visualization/Information Sharing

Once information is collected, the next step of the planning process is to present and visualize information in a way that guides decision-making, and informs members of the community. A common example of data visualization technology is Geographic Information Systems (GIS). GIS is a tool set that formats diverse data into effective and understandable maps. Expansion of GIS technology has allowed planners to create powerful and complex maps to understand the complicated urban fabric of their city, while providing user-friendly maps to the community that facilitate discussion and engagement (Decker 1993). In addition, Hanzl (2007) discusses how advancement in virtual simulation promises better comprehension of urban futures to both planners and the public. The capacity of planning technology to better present information and plans for urban environments will allow public officials, and the community alike, to make educated decisions about the future of cities.

Decision-making/Service Providing

The ultimate goal of the planning process is to advise and improve effective decision-making by government and the community. The technology influencing the data collection and visualization aspects of the planning process inevitably lead to better decision-making. However, voting, polling, and crowdfunding technologies more directly aim to improve the decision-making process. For example, Neighborly, a web-based crowdfunding application, allows local citizens to donate to community improvement projects and services in their city (neighborly.com). Whereas, voting and polling platforms, promote direct democratic action, and empowers citizens to influence decisions directly and indirectly.

Decision Monitoring/ Reassessment of Information

In the urban planning process, after decision-making, monitoring is required to assess the impacts of these decisions. As the final phase of the planning process, reuse of many planning technologies often occurs in order to collect and visualize information regarding the status of new decisions. However, some technologies primarily serve to monitor certain types of the decision-making. For example, traffic-monitoring services, such as GoogleMaps, can provide long-term monitoring data, and even provide real-time updates to individual drivers about their route times. Similarly, utility companies use specific application features to display usage to their customers, or city planning department can provide permit applicants with application monitoring services. In the frontier of monitoring technology, mobile applications are leading the way with real-time user data, and mobile monitoring options (Evans-Cowley, 2010).

1.6. SUMMARY CHART	
Section Title	Main Ideas and Topics
1.2 Civic Technology Defined	"The term "civic technology" represents the industry and social movement aimed to transform public engagement and governing bodies for the advancement of the commonwealth within urban communities through the means of technological innovation."
1.3 Civic Technology as a Social Movement	"Civic technology, as a social movement, has formed an active and engaged community, but remains ambiguous in identity, vision, and inclination." "Civic technology is a diverse industry with emerging stake in modern social construction, and produces an assortment of technologies serving an ever-growing demand from people to participate in their communties."
1.4 Civic Technology as a Growing Industry	"The civic tech industry, originally comprised of 16 companies, has experienced an average 23% compounded annual growth rate (CGAR)." Fields, Clusters, Services, and Taxonomies.
1.5 Civic Technology Aimed to Transform	An Aim for Better Public… An Aim for Better Government… An Aim for Better Data and Social Equity… An Aim for Better Planning…
Aspects of the Planning Process	*Data/Information Collection* *Visualization/Information Sharing* *Decision-making/Service Providing* *Decision Monitoring/ Reassessment of Information*

2.1. Method

The following is a personal market assessment of civic technologies related to the field of planning performed using readily available information and data from *Crunchbase.com*, and other market analyzing websites and tools. The survey identifies fifty-eight planning technologies, and analyzes nine key topics of each. The nine topics are: 1) Knight Foundation's Field Identification, 2) Knight Foundation's Cluster Identification, 3) International Data Corporation's Services Identification, 4) Riggs and Gordon's Taxonomy Identification, 5) Aspect of the Planning Process Influenced, 6) Number of Employees, 7) Year Company was Founded, 8) Location of the Company, and 9) Company Investment.

The planning technologies were identified using a variety of search engines and studies conducted by civic technology by civic tech-focused organizations. In this study, planning technologies are defined as a technology with explicit or, commonly accepted, implicit influence in the field of planning. Each technology's function was identified, and is only included in the survey if found to be a "planning technology" because many civic technologies are not directly related to planning. After this determination, the technologies are assessed using the nine evaluation topics listed above.
To conduct the survey of planning technologies, the nine key topics were evaluated using several online data sources, such as, crunchbase.com, linkedin.com, and the individual company websites. Many of these assessments identified for topics 1-5 required judgement from the surveyor to determine each technology's classification. For example, to determine the Knight Foundation's cluster identification, the surveyor would assess the product and/or service description to identify the best classification for the technology based on the definitions provided by the Knight Foundation in Part I. These determinations were than record into a matrix. *See table below*. Secondly, for topics 6-8, each technology was assessed using crunchbase.com to identify the company's founding year, employment size range, and its amount of recieved investment.

The survey is not an appropriate sample size, and is used to provide a general understanding of the planning technology market. The study does not provide a full scope of all planning tech available. However, the data does suggest several trends, and provides insight into the topics in question. Similarly, the survey may demonstrate how both agencies and communities are absorbing planning technology, and their general demand and support. The raw data is available in *Appendix A*, however, below is an example of how information was recorded by surveyor.

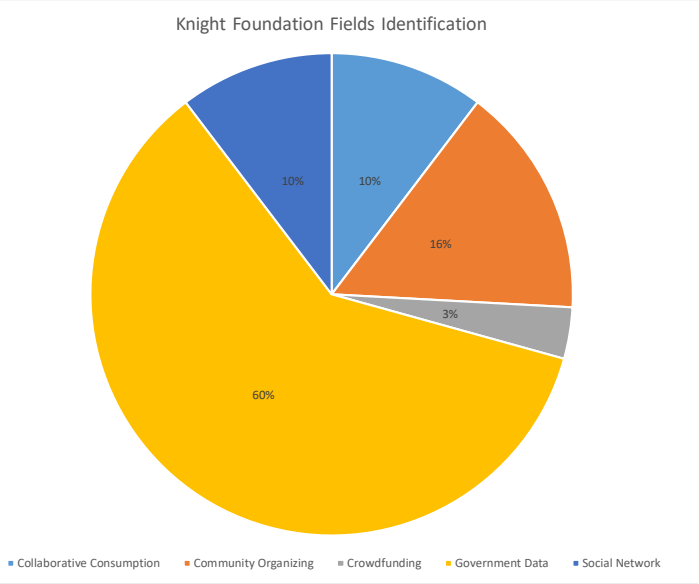
Year	Name	Knights Foundation's Fields	Knights Foundation's Clusters	IDC Services
1999	Accela	Government Data	Data Utility	Resident Feedback
2008	Airbnb	Collaborative Consumption	Peer-to-Peer Sharing	Community Action and Crowdsourcing
2011	AmigoCloud	Government Data	Visualization and Mapping	Visualization and Mapping
2010	Appallicious	Government Data	Visualization and Mapping	Visualization and Mapping
2000	Azavea	Government Data	Visualization and Mapping	Visualization and Mapping

Riggs & Gordon Taxonomy	Part Planning Process	Location	State	Employee	Funding
Utility & Productivity	Decision Making/Service Providing	San Ramon, CA	CA	500+	$ 223,500
Transactive	Decision Making/Service Providing	San Francisco, CA	CA	1000+	$ 30,000,000
Utility & Productivity	Visualization	San Francisco, CA	CA	11+	$
Utility & Productivity	Visualization	San Francisco, CA	CA	11+	$
Utility & Productivity	Visualization	Philadelphia, PA	PA	50+	$

2.2. Results

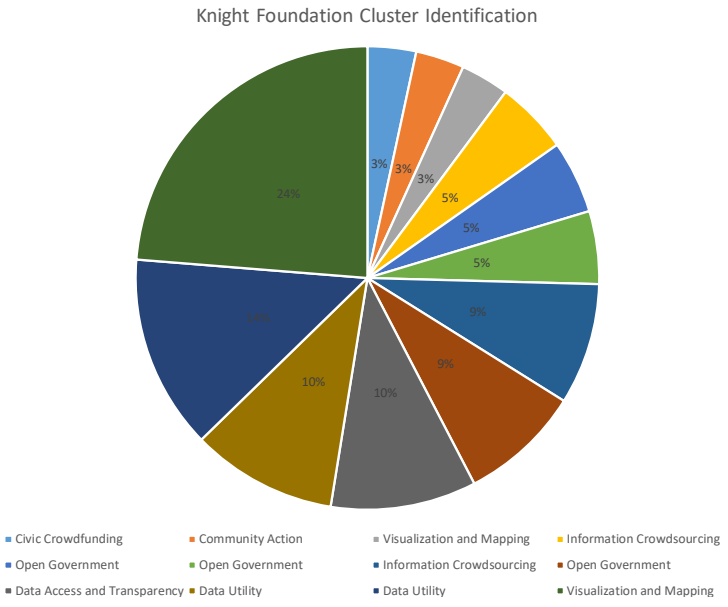
Knight Foundation Fields

The Knights Foundation identified five main fields for categorizing civic technologies; collaborative consumption, community organizing, crowdfunding, government data, and social networking. The survey of planning technology identified the most technologies as government data with 35 out of 58 responses (60%), and the second most observed was community organizing with 9 out of 58 responses (16%). Therefore, the survey indicated many planning technologies are used to share, analyze, or visualize government data. Ultimately, the results may indicate support for planning departments to provide greater transparency and make more data-driven decisions through utilization of available technologies in planning practice. However, these categories are general, and provide a narrow scope of the services and diversity provided by planning technology.



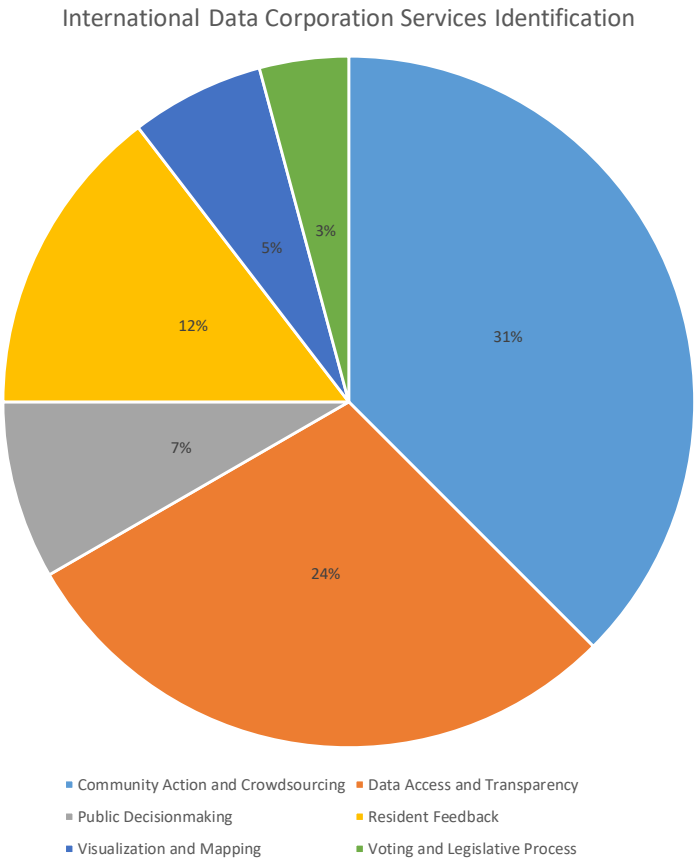
Knight Foundation Clusters

In addition to "field" categorization the Knight Foundation identifies twelve clusters of civic technologies; civic crowdfunding, community action, community organizing, data access and transparency, data utility, information crowdsourcing, neighborhood forums, open government, peer-to-peer sharing, resident feedback, visualization and mapping, and voting. According to the survey results, the highest number of technologies identified as visualization and mapping with 13 of 58 responses (22%). Similar to the field categories, the next highest number of technologies identified as data utility (14%), data access and transparency (10%), and community organization (10%). The fewest number of technologies identified as civic crowdfunding, community action, and voting with two responses (3%) each. It is important to note responses were categorized by primary function, but some technologies may serve in multiple cluster categories.



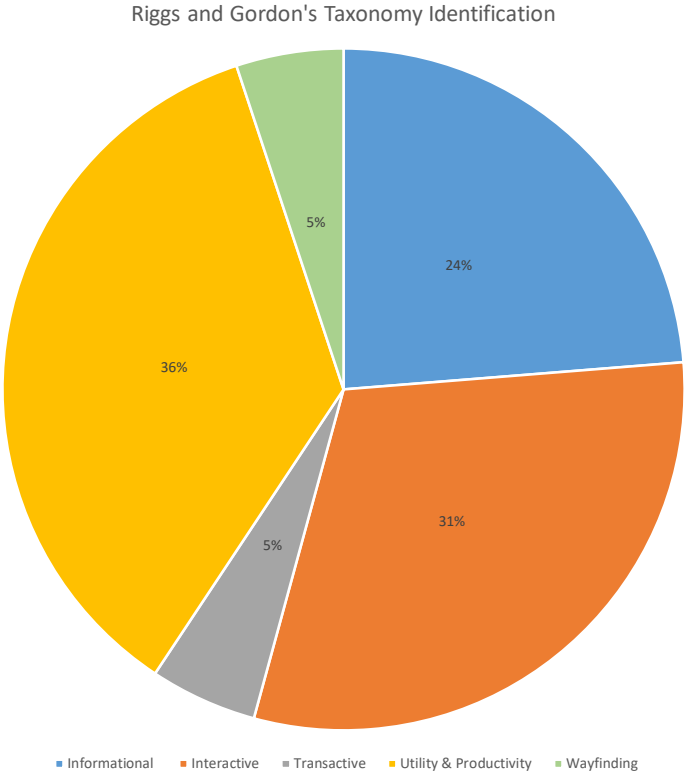
International Data Corp Services

The International Data Corporation categorized civic technologies within six major services; community action and crowdsourcing, data access and transparency, public decision making, resident feedback, visualization and mapping, and voting and legislative process. Interestingly, the highest number of respondents identified as community action and crowdsourcing with 18 of 58 responses (31%), which differs from the Knight Foundation findings. However, the next highest number of technologies were in data access and transparency, and visualization and mapping, which suggests results more aligned with the Knight Foundation numbers. In the International Data Corporation assumptions, the fewest number of technologies surveyed were in the service identifications of public decision-making (7%) and voting and legislative process (3%). These numbers may indicate demand for technologies influencing direct decision-making and voting is low, or adequate technology is not yet available.



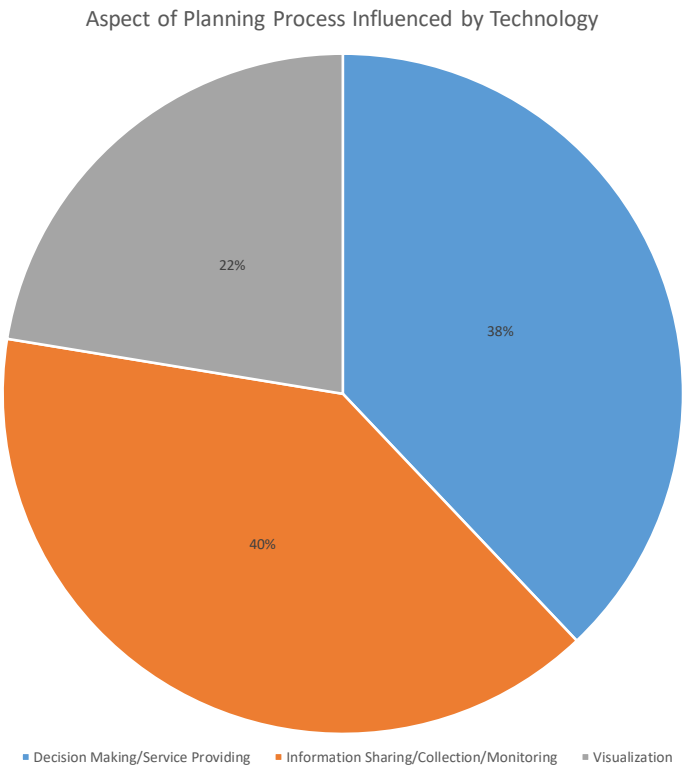
Riggs and Gordon Taxonomy

In Riggs and Gordon's assessment, they identified five main taxonomies; however, the survey did not identify any technologies in the virtual reality/gaming category. The four taxonomies identified in the survey results were informational, interactive/transactive (separate identifications in survey), utility/productivity, and wayfinding. According to the results, the three major taxonomies demonstrated were utility/productivity (36%), interactive (31%), and informational (24%). The fewest number of technologies were identified as wayfinding with three of 58 responses (5%); however, this may be due to a limited number of mobile applications surveyed under these conditions. In the survey, transactive technologies were identified separately, and totaled with three technologies as well (5%).



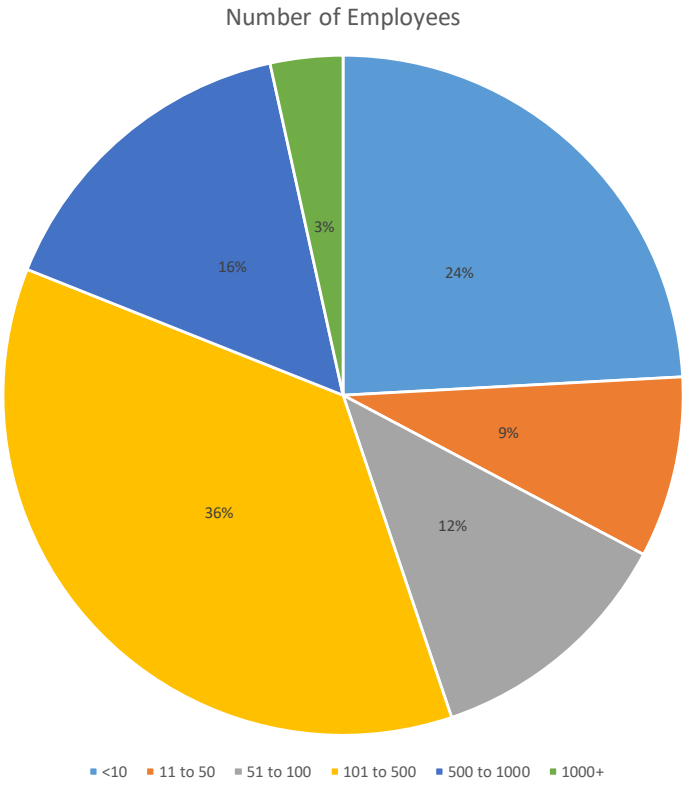
Aspects of the Planning Process

As explained in Part I, planning technology influences different aspects of the planning process. Often times, technologies can be utilized in multiple aspects of the process as well. In the survey, technologies were assigned to one of three aspects of planning (data sharing technologies encompassed both collection and monitoring). Under these conditions, the survey indicates most technologies could primarily be used for information sharing, collection, and monitoring purpose with 23 of 58 responses (40%), which was closely followed by technologies influencing decision-making and service-providing with 22 of 58 responses (38%). Interestingly, the fewest number of technologies were thought to visualization (22%) despite being a larger category prior. Ultimately, many aspects of the planning process are receiving attention from technologies in the market.



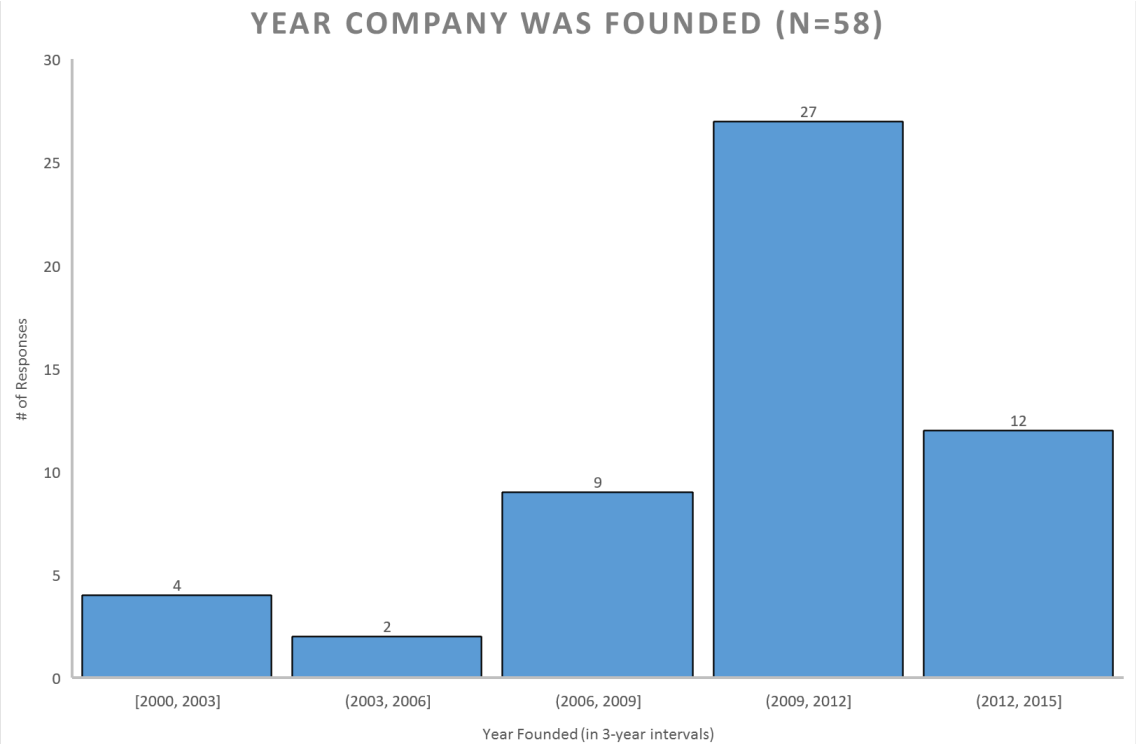
Company Size

The survey also assessed the size of each company ranging from smaller-sized (less than ten employees) organizations to companies with several thousand on-staff. The largest number of technologies surveyed had an employment base between 11 to 50 people (36% of responses), and the vast majority of companies had fewer than 500 employees (85% of responses). Expectedly, most of the leading tech companies in this category were popular social networking and peer-to-peer sharing platforms, such as, *Facebook, Uber, and Airbnb*. However, some of the larger planning-specific tech companies, such as, *Accela, ESRI, and Socrata* also held a substantial number of employees. However, as discussed in the next finding, most planning technologies are new ventures for the tech industry to understand civic processes, and public planners' reaction to tech. Often, much smaller in size.



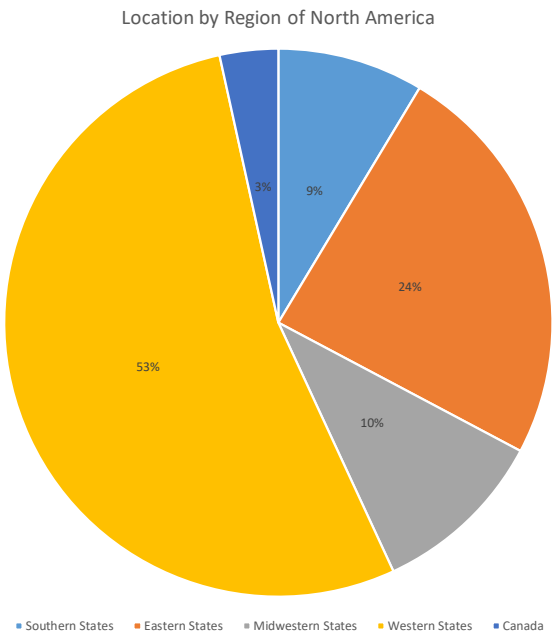
Founding Year

The survey provides the year each company was founded, which gives insight to how attention has developed for planning technologies. The largest number of companies were founded between the 2009 and 2011 (47% of responses), and the second most were founded between 2012 and 2015 (29%). A total of 15 companies, about a quarter of responses, has a founding date before 2009, which may indicate new tech companies are exploring options in technologies influencing the field of planning. It also indicates planning technology is a new market, and industry is developing a better understanding of how technology plays a role in government, and citizen prefer to engage in their communities.



Location of Headquarters

Another topic explored in the survey was location of each tech company. Slightly less than half of the companies were headquartered in California (48% of companies surveyed), with many located in Silicon Valley. By region, 53-percent of companies were located in the Western States, 24-percent in Eastern States, 10-percent in Midwestern States, and 8-percent in Southern States. Outside of California, the next highly concentrated area for planning technologies was in New York (12%), which is similar to the overall distribution of technology in the United States.



Company Investments and Value

The final assessment made from the survey looked at the investments made in most of the technologies. Of the fifty-eight subject technologies, forty-two (72%) had available information regarding investments. Excluding the popular and wealthy civic technologies and social media giants with values greater than half a billion dollars, the average investment value for the remaining companies was $29,683,575 (all companies: $13 billion). The median investments amongst the remaining technologies was $3,800,000. The survey indicates a wide range of investments, but also demonstrates how many planning technologies receiving funding are generally well funded.

Average
$29,683,575
Median
$3,800,000

2.3. SUMMARY CHART

Survey Topic	Major Findings
Knight Foundation Fields	- Five field classifications. - Highest number identified as Government Data. - Fewest number identified as Crowdfunding
Knight Foundation Clusters	- Twelve cluster classifications. - Highest number identified as Visualization and Mapping. - Fewest number identified as Crowdfunding, Community Action, and Voting.
International Data Corp Services	- Six Service Classifications. - Highest number identified as Community Action and Crowdsourcing. - Fewest number identified as Voting.
Riggs & Gordon Taxonomy	- Five Taxonomy Classifications. - Highest number identified as Utility/Productivity. - Fewest number identified as Wayfinding.
Aspects of Planning Influenced	- Three categories of influence. - Most influence information sharing, collection, and monitoring. - Fewest influence data visualization.
Company Size	- Most companies have between 11 and 50 employees.
Year Founded	- Most companies surveyed were founded between 2009 and 2012
Location of Headquaters	-48% were located in California -53% in Western Region States - 24% in Eastern Region States
Company Investment	- Average: $29,683,575 - Median: $3,800,000

3.1 Method

The purpose of this section is to provide a quasi-roundtable discussion of planning professionals, in their public capacity, on the topic of planning technology. The information is presented as a narrative, and assesses a conducted survey of public planning officials primarily in the West region, but was distributed to planners across the United States. The survey has a total of 20 participants who provided answers to the eight questions below (Responses Available in *Appendix B)*:

1. How do you feel about the increasing use of technology in the planning field?
2. Are you, or the organization you work in, currently working to improve its use of planning technolgy? How?
3. How do you think planners and citizens respond to the use of planning technology?
4. Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
5. What types of planning technology is your organization using that you feel are beneficial? Why?
6. What types of planning technology is your organization using that you feel are not beneficial? Why?
7. What type of planning technology would you like to see more available/affordable? Why?
8. Do you have any new ideas for planning technology?

Participants, planning professionals in their public capacity, were identified based on their region in the United States, size, and accessibility of contact information. A number of city websites were explored in each region of the United States with about ten cities contacted from each region; (standard) Western, Midwestern, Southern, and Eastern Regional States. A diversity of city size was also attained to provide variety of perspective. Ultimately, planners were contacted via email when it was provided on their city website. Each participant was provided an online survey link (surveymonkey.com). The survey did not record names or locations of participants to ensure anonymity. In addition, participant were asked to share the survey with other public planners who could provide valuable insight to the discussion topics.

To analyze and provide narrative, each survey question was themed using keywords from their response to each question. For example, if several planners identified a similar issue with a commonly used planning technology, the topic was discussed further in the narrative. Similarly, unique topics and themes revealed by participants were identified, and framed appropriately in the narrative. Once the entire narrative was complete, a summary table was created to assess the main topics discussed in each question.

The survey can be broken down into three overarching topics; 1) general attitude toward planning technology, 2) the main technologies being used by planners, and 3) the attainability and desire of new planning technology.

The first four questions of the survey are to provide a general context of planners, and their opinions and tendencies toward using technology in the field. In general, the analysis indicates planners have an overall positive view toward tech utilization, but do share several concerns amongst themselves and the community. In addition, it discusses the few and common technologies planning departments currently find viable, and reveals a general hesitation to implement new technologies too quickly. These questions provide valuable insight to the opinions of planning officials, concerns over current viability, and reveals an optimism of future expansion.

The next two questions, five and six, provide a discussion on the reasons planning professionals find commonly adopted technologies beneficial in the planning process, and begins to form a rationale and understand of what planning tech implementation may look like in the future. In sum, planning technology will require planners and supportive community to "make a case" for tech expansion in agencies.

The final questions, seven and eight, explore the desire amongst planners for new technology, and long-term need for improvements. In many instances, planners focus on the widely used planning technologies, such as, Geographic Information Systems and permit tracking software, but other are hopeful new advancements promise efficiency of planners and effectiveness of a technologically empowered community. Collectively, the following narrative serves to provide a better understanding of the positions and viewpoints public planning officials have in regards to increasing use of technology in the field of planning.

3.2 Results

Q1: How do you feel about the increasing use of technology in the planning field?

The survey responses revealed a generally positive attitude toward the advancing use of planning technology because of its promise to improve efficiency, communication, and productivity. Some survey respondents felt strongly the increased use of technology would lead to "better decision-making". Although the responses were overwhelmingly supportive of planning technologies, participants also discussed several warnings and risks associated with their development. A major concern of those surveyed is technology being used to encourage the participation residents who can afford and have access to tech over those who cannot easily access the same products. Thereby, creating a technological barrier to the planning process. Other respondents acknowledge the benefits of technology, but does not wish for its replacement of traditional planning practice, nor an industry dependency on technology in order to succeed. Notably, there is an advantage to "human analysis" in the field, which better understands the "complexities of planning" than most software can perform. In addition, one respondent indicated new planning tools used—specifically by NIMBYs—to overwhelm, slow, and make inefficient the planning process negatively impact the field.

Ultimately, there are many benefits to the technologies implemented by the surveyed planners. So much so, some participants revealed their departments have dedicated staff for tech-specific positions. In doing so, tech-friendly planning departments are able to "keep up with industry and business", which ensures peak performance as a public organization. However, despite its favorable support, agencies may find it difficult to adopt new technologies requiring slight "growing pains" to implement. These "growing pains" are often due to the maintenance and training demands for improving technologies, which aim to keep planners and communities "on the same page".

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?

According to the open-ended survey responses, many of the planners, and their organizations, are currently working to improve their use of planning technology. About 16 of the 20 survey responses

(80%) stated they were working to improve their technology use. A vast majority of participants mentioned the same types of technologies in which they were trying to implement, which include permit tracking software, GIS, and electronic archives, such as, digital agenda packets. The number of common typologies may demonstrate a high demand from either planners, the community, or government officials to provide specific types of services and functions. In general, these technologies, as explained by one respondent, focus on government "efficiency" and "leveling the field" for community members by sharing empowering information.

Less universally adopted, other technologies mentioned in the survey responses focus on sharing information and web-based engagement, project management, and going paperless. Similarly, these technologies demonstrate the common theme of efficiency and "leveling the field". In regards to web-based information sharing and engagement, one respondent identified younger planners as individuals who implement more technology, such as, social media into the profession, and often work to integrate them into the planning process. Therefore, although the common types of technologies are not necessarily diverse, the survey may identify a new generation of planners who are passionate about implementing broader planning technology.

In regards to the less common technologies being adopted by planners, several struggles have arisen for their integration into the planning process. For example, community engagement platforms were revealed to, at times, give a greater voice to those who already participate in the planning process, rather than, engage new members of the community. Identifying a key hindrance to providing engagement technology in planning agencies. For planners in the workplace, switching to digital documentation can prove difficult for reviewing larger documents, and permitting software may require a lengthy startup period, in which planners must master the program. These struggles can also contribute to slow absorption of planning technology. Collectively, many of the surveyed planners are working to improve technology use, however, some have experience limitation because technology must be proved effective before it is implemented, and often has a narrow focus in regards to typology.

Q3: How do you think planners and citizens respond to the use of planning technology?

As expected, planner and citizen responses to the use of technology is a "mixed bag", and is often different for each community. For planners, respondent explain there is a need for staff to be better equipped to understand the complexities of their positions, however, some are averse to change, and prefer traditional face-to-face human interaction. In the community, there is a similar push-back due to preference differences or distrust of government's technology usage all together.

Planning technology is believed to improve the efficiency of planning work and bring new perspective. However, some practicing planners dislike the idea of "replacing" too many aspects of the process with new tech advancements. Therefore, new technology may be best integrated as more of a supplement to current planning practices. Although, this may be difficult if the purpose of adopting the tech is to replace or reduce the work required by planning staff. In comparison, community members are hesitant to trust new technologies being used by public services, but others may also demand the use of technologies when a number of benefits are realized. These contradicting opinions from the public may occur simultaneously, which, in turn, gives planners high-demand for using new technology to improve work whilst having opposition to its implementation into the process. Often times, as some respondents indicated, leaving planners concerned about using technology to change the way they plan.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?

In terms of viability for new technology in planning departments, it seems unsure to many of the surveyed planners if it is a viable option in the short-term, but many are optimistic about its increased success in the future. One respondent indicated there are often times "hidden fees" associated with updating tech in a public organization because it may require large-scale, and expensive, equipment updates, staff training, or other indirect costs outside of the product itself. Therefore, as a respondent revealed, sometime there are "higher priorities to spend tax payer monies on", which may provide greater or more direct return on investment to the general public. Planners often have to "make a case" for a new technology, which may require demonstrating the benefits with case studies, trials, or community workshops before making neccessary investments.

Currently, many planning departments work within their financial means, but some have began incrementally adapting to secure funding for new planning tech. For example, a number of respondents revealed their organization has setup a tech surcharge for development review, which create a fund enabling them to pay for or expand technology as needed. By introducing these fees, the department may be able to "stay ahead of the curve" as tech utilization in planning continues to grow. Other respondents have also experienced success by adopting tech-supportive strategic goals, which make it easier for public officials to justify increased funding for new technology. However, as noted, these improvements often take time, and some public planners feel private planning might absorb new technologies more rapidly, and an increased of outside consulting may be necessary for slow-to-adopt planning departments in the future.

Q5&Q6: What types of planning technology is your organization using that you feel are beneficial? not beneficial? Why?

According to survey responses, there are a few almost universally used planning technologies, and there are several commonly used amongst other public planners. The two outstandingly common planning technologies mentioned were Geographic Information Systems (GIS), and updated permit tracking software to observe, often in real-time, the progress being made on a application. GIS is viewed positively for its ability to provide planners and communities graphic depictions of their efforts, and regularly serves to bring community onboard with beneficial and complex projects. Updates to permit tracking software were recognized for their ability to increase government transparency, and reduce the amount of seemingly unnecessary interactions with the applicant. However, some respondents felt the software required a reasonable amount of adjustment from planning staff, and often experienced glitches. In general, these two technologies were regarded positively, and relatively simple to implement into the planning process.

Several other commonly used planning technologies were identified by survey participants. A few indicated increased use of online information sharing, such as, social media, online agenda packets, and data archives, were beneficial to improving the planning process, and could potentially decrease costs for departments. Similarly, respondents enjoyed technologically improved information, produc-

tivity, and engagement amongst coworkers from project management applications and software. Collectively, these technologies serve to meet planner and community demand for tech aimed to improve efficiency and civic engagement.

In regards to non-beneficial technologies, survey respondents did not feel technologies used in public planning were unsuccessful. Several suggested software contained annoying, but manageable, glitches, may require additional equipment updates, or was not useful in unique circumstances, such as, using digital platforms to read large documents. However, there was a general and reassuring consensus that planning technology in the public sector is only absorbed if "proven beneficial", and, otherwise, would "hopefully not be used".

Q7: What type of planning technology would you like to see more available/affordable? Why?

In an effort to better understand planners' desires to expand technologies and identify areas of interest for planning departments, the planners were asked to reveal their desires for available and affordable technologies. Several planners simply suggested increase incentives and investment for improving equipment in agencies to support new software, and others identified specific technologies and potential improvement areas. Many of these suggestions were in regards to increased information sharing and visualization. For information sharing, respondents identified using publically accessible GIS platform allowing citizens to receive quick and easy information about parcels, and reduce the need to inquiry planners. In addition, there is support for platforms allowing multiple public agencies to provide information and review projects, and comprehensive online data archives. Regarding data visualization, participants would enjoy more attainable 3-D simulation software for large-scale planning, and GIS integrated with internal impact analysis capabilities. Aside from software, several planners were interested in expansion of hardware allowing large planning documents to be viewed more effectively. Interest was also expressed for increasing resources dedicated to collecting and updating more consistent aerial photos, which are used by agencies to best visualize the current state of their environment.

Collectively, these responses may suggest planners are interested in advancements improving the capabilities of existing and accepted technologies. Many planners and communities are aware of online government resources and the use of data visualization software (GIS). Therefore, improving web-based technologies for information sharing and data archiving may be a viable option for future tech expansion in some agencies. Similarly, planners are aware of modeling program, impact analysis features, and satellite aerial imagery, and express interest in improved attainability of newer and easier to use versions of these technologies.

Q8: Do you have any new ideas for planning technology?

The purpose of this question is to explore the potential areas of planning with the greatest need for technological assistance. Some of the planners who responded with new ideas identified correcting online engagement platforms, expanding open data services, and improving planning decision-making, as issues new planning technology may consider addressing. As previously indicated, a concern of online community engagement is primarily providing another outlet for regularly engaged community members to increase their public voice. In response, one participant desired online community engage-

ment technologies specifically geared toward increasing involvement of disadvantaged or underrepresented populations. In regards to government accessibility, one planner suggested all levels of government foster an aim toward providing open data from all public entities, and creating a one-stop-shop for local, state, and federal data access. Thereby, providing all jurisdiction with the means to publish their valuable information. Noting the importance of transparency and user-friendliness of new technologies. In addition, survey respondents shared new ideas to improve the internal work and efficiency of planning staff. Firstly, a suggestion for a software capable of preliminary plan checks, which may allow applicant to quickly review code compliance, and, ultimately, accelerate their review process. A second suggestion was to create a easily navigable database of standardized planning solutions for common issues, which could be made widely available to planners who need quick and easy resolution recommendations. A technology able to assess standard planning issues would allow planners to standardize good planning practice, and assist planning staff with limited research capabilities Collectively, these new tech ideas do not indicate any key areas of interest planners hope to improve with technology, but it reinforces the aim of planning technology to improve efficiency of the process, and more effectively involve the community.

SUMMARY CHART

Question	Main Responses and Findings
Q1: How do you feel about the increasing use of technology in the planning field?	- Positive Outlook - Risks Identified: Barrier to entry, misused, and perceived replacement of traditional planning. - Planner experience "growing pains" for technology implementation.
Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?	- 80% of planners surveyed were working to improve technology use in their organization. - Focus of government efficiency, and "leveling the field" for informed community. - Newer generation of planners eager for improvement.
Q3: How do you think planners and citizens respond to the use of planning technology?	- Responses are a "mixed bag". - Many planners think positively of tech utilization, but some are adverse to change. - Citizens experience both high demand for improved government efficiency, and distrust and dislike of increase tech use.
Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?	- Unsure of short-term viability, but optimistic about future success. - Concerns: Cost and staff expertise.
Q5: What types of planning technology is your organization using that you feel are beneficial? Why?	-Geographic Information Systems and Permit Tracking Software. - Common: Online information sharing and management tools.
Q6: What types of planning technology is your organization using that you feel are not beneficial?	- Some technologies experience glitches, require hardware updates, or less than useful in some situations. - Only adopt or purchase if proven beneficial.
Q7: What type of planning technology would you like to see more available/affordable? Why?	- Many cities want improved equipment and infrastructure. - Most popular are information sharing and data visualization software.
Q8: Do you have any new ideas for planning technology?	-Online community engagement aimed for disadvantaged communities. -Federal, state, and local data bank. -Automated planning check and issue resolution/suggestion software.

4.1 Overview

The following is a set of guidelines aimed to assist planning agencies and local communities with appropriate and effective implementation of technologies into their government processes. The principles and strategies are adapted from similar assessments performed in the City of Austin, TX and the City of Chicago, IL that discuss the overall use of tech in their cities. The resources below provide a higher-level discussion of key methods agencies can use while transitioning to greater tech use, and is presented in three key sections: 1) a summary of benefits associated with implementing technology in government, 2) guiding principles, and 3) key strategies for implementing the guiding principles. *Below is a list of benefits provided in the City of Chicago Technology Plan:*

BENEFITS CHART		
Benefit	Description	Relation to Part I, II, & III
Savings	Often, planning implementation of technologies increases the productivity and effectiveness of planning efforts, which, ultimately, decrease the amount of time, money, and resources required of the taxpayers.	Part I: Reference Aim for Better Government pg. 12, and Aim for Better Planning pg. 13. Part II: Reference Aspects of Planning Process pg. 19 Part III: Reference: Reference Question 2, 5, & 6
Services	Increased information and staff capabilities made possible with planning technologies improves an agency's ability to deliver new and existing services to the community	Part I: Reference Aim for Better Government pg. 12, and Aim for Better Planning pg. 13. Part II: Reference KF's Clusters pg. 17, and Riggs and Gordon's Taxonomies Pg. 18 Part III: Reference Questions 3 & 4
Engagement	Technology improves government and resident capacities to engage in innovative planning practices, and solve community issues.	Part I: Reference Aim for Better Public pg. 12, Aim for Better Data and Social Equity pg.13, and Civic Tech as a Social Movement pg.9 Part II: Reference IDC Servicespg. 18 Part III:Reference Question 7 & 8
Access	Technology provides access to powerful resources, such as, internet, computers, and software, which offers increased support to constituents.	Part I: Reference Aim for Better Data and Social Equity pg. 13. Part II: Reference KF's Fields pg. 17 Part III:Reference Questions 3 & 2 pg. 23-24
Jobs	Technology requires new skills and training programs, which, inevitably, will create new tech-based jobs in the planning field.	Part I: Reference Civic Tech as an Industry pg.10 Part II: Reference Company Size pg. 18 Part III: Reference Question 4
Skills	An increased use of planning technology progresses the comfortability of both staff and residents in becoming digitally active in government.	Part I: Reference Aim for Better Planning pg.13, and-Civic Tech as an Industry pg.11 Part II: Reference Aspect of Planning pg. 19 Reference Clusters and Services pg.17-18 Part III: Reference Question 3 & 4
STEM	Integration of technology will attract and retain science, technology, engineering, and math professionals to the field of planning, and expand partnerships between STEM industries and government.	Part I: Reference Civic Tech as an Industry pg. 10 Part II:Reference Company Size pg. 18 and Locations of Headquarters pg. 19 Part III: Reference question 4, 7, and 8.

4.2 Guiding Principles

Tech Progressive Policy:

Policy is a force of change for all cities across the United States. A city aiming to improve its use of technology will need to draft and adopt policies that enables city departments, such as planning departments, to supply new technology, and meet the innovation demands of their communities. These policies may guide the development of city facilities to support technological updates, or may promote a shift in governance structure to facilitate the advancement more directly. In addition, new policy can help build a road map securing funding for technology utilization. A city planning department with tech progressive policy can lay the foundation for establishing more implementation down the line.

Support and Provide Resources for Technology in the Community:

In order to foster a community supportive of technological advancement a jurisdiction should provide resources equipping the residents to participate actively in the newly developed planning process. Resources can be education, awareness, or tech-oriented, and should be used to attain tech progressive policies. By doing so, planning stakeholders can ensure and encourage new technologies are well understood and effective in practice. In addition, providing open access resources can assist and promote efficient governance in other agencies, and surrounding jurisdictions. A city with community resources provides appropriate assistance to its planners and community members.

Restructure Internal Technology Support Structure:

To achieve technology goals and meet community tech demands, city planning departments need to be internally prepared, and often must restructure. As mentioned in Part III, city planning departments are experiencing difficulties implementing planning technologies due to limited skill sets, and physical hardware. Therefore, cities with an aim at a tech-future, will need to restructure their staffing to attain a skill-level appropriate for development, and better equip themselves via political and financial means. In doing so, creating a comprehensive and tech-oriented government structure, which can leverage the overall advancement and acceptance of a tech-equipped planning department.

Tech-friendly Culture throughout Government Staff:

In some ways, technology has become a culture, which should be adopted amongst staff to encourage a positive and supportive transition to increased use of planning technology. A tech-friendly planning department is achieved through staff training, and recognizing the results associated with new technologies. However, urban planning, ultimately, must serve the entire community, and should use tech as a supplement to traditional planning methods. Therefore, it is important to develop a department with a tech-friendly culture that strives for greater planning through technology utilization, and encourages community members to participate in tech solutions.

Strong Partnerships in Tech:

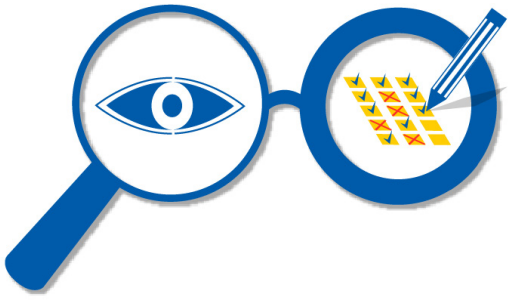
By forming strong partnerships in the tech industry, cities can ensure planning staff has access to necessary resources, and they receive the most up-to-date technology. In order for a city to reach and understand all available tech, it should expose itself to industry professionals. Often times, the tech sector will offer incentives, provide training workshops, and hold network conferences, which can keep a city informed about available technology. These strategies are especially important for metro regions located around tech hubs because they often have the greatest opportunities to develop these strong relationships. Similarly, other organizations can provide additional support, recognition, and funding required for greater planning tech innovation.

4.3 Key Strategies

Goals, Plans, and Policies

A key part of tech implementation is creating a plan. By drafting technology goals and policies, a city can justify to both decision makers and residents their use of new technological resources. A plan can also help a city phase their efforts, and maintain progress through changes in department staff. Goals should be attainable and provide a detailed scope the department aims to accomplish. Policies should contain specifics, standards, and deadlines, which are used to measure the advancement and success of the city's tech goals. These goals, policies, and plans are specific to each agency, and should be tailored to met the needs of their own constituents. Often times, adoption of a plan is the first steps in a city's implementation of planning technology.

Source: http://www.handymanstartup.com/five-steps-to-ensure-success/



Source: http://shinigeria.org/wp-content/uploads/2015/11/Research-Monitoring-and-Evaluation-e1375459402452.png

Measures and Monitoring

A city should understand the status of their progress toward meeting measures adopted in their tech policies, and create monitoring programs to ensure they accomplish technology goals. These monitoring programs may be performed regularly by dedicated staff, or may receive an appropriate level of attention from management. More importantly, the findings and status of meeting adopted measures should be distributed to staff to both ensure their understanding of tech achievements, and encourage a department culture open to adopting new planning technology. By implementing these monitoring strategies, a city can ensure progress will and is being made within their planning agency.

Access to Technology Resources

A city should ensure resources for tech utilization is available to all residents in an effort to guarantee community members are able to participate in innovative planning work. Therefore, if a city does not already, it should provide appropriate equipment and hardware for citizens to use, such as rentable computers and iPad at their public libraries. Planners may also provide technology at community outreach events and public meetings to provide residents with the means to participate. By doing so, planning agencies may experience greater success reaching disadvantaged communities, which was a major concern expressed by planners in Part III, who felt technology isolated certain populations in the community. Technology may have major income and access barriers, but a city can overcome these obstacles by providing the community with hardware resources.

Access to Tech Training and Support

In addition to being equipped with appropriate technology, residents must also have access to training and support to better understand the transitions to increased technology use in planning. Not all residents are tech-literate, and some may require training on how to use new planning technologies. Fortunately, companies often provide online training and tutorials for new planning software, and/or agencies may provide staff or workshop resources for residents. In order for technology to be a reliable option for planning departments, they must be prepared for inevitable glitches and tech failures by assisting residents with appropriate IT support for planning technologies. If the agency guarantees tech support for all community members, residents may feel more inclined to used tech as part of the planning process.

Open Data and Other Resources

A common and beneficial resource provided by planning agencies is open data. Open data provides the general public, businesses, and organizations with a variety of data that can be used to help make data-driven decision about the community. By having access to the wealth of data collected by government agencies, a community enjoys greater transparency, and a more comprehensive understanding of the progress and impacts of public planning. Facilitating an open data encourages a well informed and tech-equipped public. Aside from open data, cities may provide other digital resources, such as, online GIS platforms, videos of city council meetings, agenda packets, and other public file archives. The online platforms and tools empower residents with the capacity, information, and awareness to utilize planning through technology. In addition, online information sharing and social networking keeps residents informed in the digital age.

School Programs and Other Awareness Programs

Planning agencies should encourage schools or attend schools to provide tech workshops, which teach students how to use planning technology to get involved in civic processes. In doing so, more students may feel empowered to participate through digital platforms, and provide local governments valuable information about its youth. In addition, students, especially high school residents will be more educated on how to participate in the planning process as young adults in the community. These school workshops can also serve as community awareness events to inform parents and other family members about technological outlets in local planning. Aside from school programs, agencies should perform awareness campaigns when implementing a new planning technology. These programs may include workshop events, posters, brochures, or newsletters. A more aware public may increase participation, interest, and support in agency tech efforts.

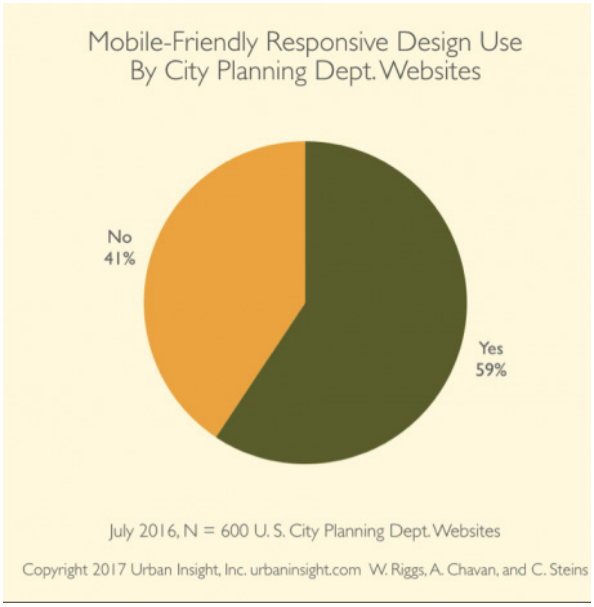
Funding and Grants

A major part of restructuring a local government to better implement tech is to allocate and secure funding. As suggested from planners in Part III, cities can pass surcharges on permits and reviews to build funds for future innovation. Cities may also find funding success by applying to grants made available by the federal/state governments, non-profit organizations, and other outlets. It is unlike an agency can accomplish many of its tech-progressive goals and policies without appropriately funding its departments. It is important to note, in some cases, planning technology generates indirect and direct savings by improving the efficiency and effectiveness of the planning process.

New Committees and Staff

A planning agency may choose to restructure staffing requirements, or create a new tech advisory committee to ensure added ease of implementing new planning technologies. In regards to staffing, specialize tech professionals may be hired directly, or departments may require new hires to have a certain level of experience using planning technology in practice. These staff changes will likely depend on the nature and size of the agencies planning department and available funds. Another restructuring strategy may be to install a tech-focused subcommittee committed to reviewing policies, budgets, and tech adoption through the scope of its benefits to the community, ability to improve the planning process, and feasibility within the agency's means. These subcommittees could serve to maintain the implementation of planning technology despite shifts in elected bodies. Generally, a restructure of planning agencies may prove beneficial to its ability to encourage innovation with new technologies.

Source: http://www.missionmode.com/importance-of-executive-sponsorship/



Source: https://www.planetizen.com/node/90628/city-planning-department-technology-benchmarking-survey-2017

Getting Online and Benchmarks

A planning agency attempting to gain support for tech implementation should orient itself with an appropriate online presence. The department should create social media accounts, provide a well-serviced website, and include features and information with the user, residents, in mind. All planning departments should develop benchmarks based on technical concerns and new tech-progressive goals. For example, Riggs (2015) research identified major benchmarks for mobile web responsiveness for local planning departments in the United States, and found of 523 cities about 445 (85%) did not have mobile responsive websites, and less than a majority (40%) did not have online parcel look-up or GIS features (2016). Agencies aiming to improve planning through appropriate tech utilization should understand and perform individual benchmark studies to understand how their progress stacks up to other planning entities.

Awards and Recognition

An agency promoting better planning through technological innovation must strive for recognition in demonstrating their success with technologies. These awards and recognitions can also show the department's success toward achieving tech-progressive goals, or serve as an outlet to secure funding for new technologies. Applying and receiving recognition is an essential part of maintaining a tech-friendly and supportive culture amongst community members, planning staff, and elected officials. Recognition and awards can be earned from newspapers, magazines, nonprofit organizations, and the tech community. Many cities known for their use of technology citywide, and in planning departments specifically, obtain awards to encourage staff, and demonstrate their improvements to residents.

Source: http://eusew.eu/eusew-awards-finalists-videos-now-online

Source: http://assessmentanalytics.com/tl-resources/boarding-organizational-growth/

On-Boarding Staff

On-boarding is a management practice used to develop a common culture amongst existing and new staff. In order for an agency to instill a supportive attitude toward planning technology, it should create an on-boarding program or presentation to explain to staff the benefits of technology utilization. On-boarding is a continued process, and should be consistently implemented by management to ensure government staff remains supportive of tech innovation in the planning process. An appropriate on-boarding program will provide resources to new staff and consultants, and encourage understanding of the agencies key tech-progressive goals and policies. On-boarding for a tech-friendly planning department can be supplemental to existing programs.

"Addition to" not "Replacement of"

As mentioned prior, the implementation of planning technology should be viewed as supplemental to traditional planning methods. Although some planning tech may reduce the need for face-to-face contact, hand-rendered images, or written materials, it is important departments remain equipped to provide residents with both methods of planning. In part III, planners expressed this as a concern for the short-term viability of planning technology because residents and staff may be slow to accept changes to the planning process. Therefore, framing the adoption of new technology as an addition to good planning practice, rather than, a replacement of tradition planning methods is a key strategy in a smooth transition toward tech.

Strong Partnerships

An important aspect of improving government through technology is agency relations with industry partners. These relationships often prove mutually beneficial, and keep cities informed about the latest and greatest technologies. In some cases, strong partnerships with State and Federal agencies help secure funding for tech implementation in the form of grants. Some of the cities recognized for tech utilization also serve as prime examples of incubator cities for the tech industry. In addition, partnerships with tech-focused nonprofit organizations can serve to gather support for tech goals, work to increase funding for partnering agencies, and, in the case for Code for America, may provide tech-specific to local issues. Collectively, all partnerships for government are an important part of advancing their practices.

Appendix A

Year	Name	Knights Foundation's Fields	Knights Foundation's Clusters	IDC Services	Riggs & Gordon Taxonomy	Part Planning Process	Location	State	Employee	Funding
1999	Accela	Government Data	Data Utility	Resident Feedback	Utility & Productivity	Decision Making/Service Providing	San Ramon, CA	CA	500+	$ 223,500,000.00
2008	Airbnb	Collaborative Consumption	Peer-to-Peer Sharing	Community Action and Crowdsourcing	Transactive	Decision Making/Service Providing	San Francisco, CA	CA	1000+	$ 30,000,000,000.00
2011	AmigoCloud	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	San Francisco, CA	CA	11+	$ -
2010	Appallicious	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	San Francisco, CA	CA	11+	$ -
2000	Azavea	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	Philadelphia, PA	PA	50+	$ -
2010	BasicGov	Government Data	Open Government	Public Decisionmaking	Informational	Information Sharing/Collection/Monitoring	Vancouver, BC	BC	11+	$ 688,000.00
2002	Boundless	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	New York, NY	NY	50+	$ 10,250,000.00
2012	Carto	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	New York, NY	NY	50+	$ 31,000,000.00
2014	Chariot	Collaborative Consumption	Information Crowdsourcing	Community Action and Crowdsourcing	Interactive	Decision Making/Service Providing	San Francisco, CA	CA	50+	$ 3,000,000.00
2012	Citizinvestor	Crowdfunding	Civic Crowdfunding	Community Action and Crowdsourcing	Transactive	Information Sharing/Collection/Monitoring	Tampa, FL	FL	<10	$ 150,000.00
2012	CityHeros	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	San Francisco, CA	CA	<10	$ 75,000.00
2011	CityScan	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	Chicago, IL	IL	11+	$ 3,800,000.00
2006	CitySourced	Community Organizing	Community Organizing	Community Action and Crowdsourcing	Interactive	Information Sharing/Collection/Monitoring	Los Angeles, CA	CA	11+	$ 1,390,000.00
2013	CivilMaps	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	Berkeley, CA	CA	11+	$ 6,600,000.00
2011	Civinomics	Government Data	Information Crowdsourcing	Community Action and Crowdsourcing	Interactive	Decision Making/Service Providing	Santa Cruz, CA	CA	11+	$ -
2003	ConnectedBits	Community Organizing	Community Organizing	Community Action and Crowdsourcing	Interactive	Information Sharing/Collection/Monitoring	Nashua, NH	NH	<10	$ -
2013	coUrbanize	Community Organizing	Community Organizing	Community Action and Crowdsourcing	Interactive	Information Sharing/Collection/Monitoring	Cambridge MA	MA	<10	$ 1,360,000.00
2011	Enigma	Government Data	Data Access and Transparency	Data Access and Transparency	Informational	Information Sharing/Collection/Monitoring	New York, NY	NY	50+	$ 34,615,000.00
1969	Esri	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	New York, NY	NY	1000+	$ 1,000,000,000.00
2004	Facebook	Social Network	Neighborhood Forums	Resident Feedback	Interactive	Information Sharing/Collection/Monitoring	Menlo Park, CA	CA	15000+	$ 350,000,000,000.00
1999	GovDelivery	Community Organizing	Community Organizing	Community Action and Crowdsourcing	Interactive	Information Sharing/Collection/Monitoring	Saint Paul, MN	MN	100+	$ 19,700,000.00
2014	GovSense	Government Data	Open Government	Public Decisionmaking	Informational	Information Sharing/Collection/Monitoring	Alpharetta, GA	GA	11+	$ -
2013	GreenBadger	Government Data	Resident Feedback	Resident Feedback	Utility & Productivity	Decision Making/Service Providing	Savannah, GA	GA	<10	$ -
2010	Instagram	Social Network	Community Action	Resident Feedback	Interactive	Information Sharing/Collection/Monitoring	Menlo Park, CA	CA	250+	$ 57,000,000,000.00
2010	Junar	Government Data	Data Access and Transparency	Data Access and Transparency	Informational	Information Sharing/Collection/Monitoring	Palo Alto, CA	CA	11+	$ 1,240,000.00
2003	LinkedIn	Social Network	Community Organizing	Resident Feedback	Interactive	Information Sharing/Collection/Monitoring	Mountain View,CA	CA	1000+	$ 26,000,000,000.00
2012	LocalData	Government Data	Data Access and Transparency	Data Access and Transparency	Informational	Information Sharing/Collection/Monitoring	San Francisco, CA	CA	<10	$ -
2009	Loveland	Government Data	Data Access and Transparency	Data Access and Transparency	Informational	Information Sharing/Collection/Monitoring	Detroit, MI	MI	11+	$ 781,000.00
2012	Lyft	Collaborative Consumption	Peer-to-Peer Sharing	Community Action and Crowdsourcing	Wayfinding	Decision Making/Service Providing	San Francisco, CA	CA	1000+	$ 6,000,000,000.00
2010	Mapbox	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	Washington, DC	DC	100+	$ 62,600,000.00
2010	Measured Voice	Community Organizing	Resident Feedback	Community Action and Crowdsourcing	Interactive	Decision Making/Service Providing	San Diego, CA	CA	<10	$ -
2012	Metropia	Government Data	Information Crowdsourcing	Community Action and Crowdsourcing	Interactive	Decision Making/Service Providing	Tucson, AZ	AZ	11+	$ 1,300,000.00
2011	MetroTech	Government Data	Data Utility	Data Access and Transparency	Informational	Decision Making/Service Providing	Alpharetta, GA	GA	11+	$ 1,100,000.00
1951	Municode	Government Data	Open Government	Public Decisionmaking	Utility & Productivity	Information Sharing/Collection/Monitoring	Tallahassee, FL	FL	50+	$ -
2010	MySidewalk	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	Kansas City, MO	MO	50+	$ -
2011	Neighborland	Government Data	Information Crowdsourcing	Community Action and Crowdsourcing	Interactive	Decision Making/Service Providing	San Francisco, CA	CA	<10	$ -
2012	Neighborly	Crowdfunding	Civic Crowdfunding	Community Action and Crowdsourcing	Transactive	Information Sharing/Collection/Monitoring	San Francisco, CA	CA	11+	$ 5,675,000.00
2010	Nextdoor	Social Network	Neighborhood Forums	Resident Feedback	Interactive	Information Sharing/Collection/Monitoring	San Francisco, CA	CA	100+	$ 210,200,000.00
2012	OpenGov	Government Data	Data Access and Transparency	Data Access and Transparency	Informational	Information Sharing/Collection/Monitoring	Redwood City, CA	CA	100+	$ 47,000,000.00
2013	OpportunitySpace	Government Data	Data Utility	Data Access and Transparency	Informational	Decision Making/Service Providing	Boston, MA	MA	<10	$ 500,000.00
2014	OppSites	Government Data	Data Utility	Data Access and Transparency	Utility & Productivity	Decision Making/Service Providing	Oakland, CA	CA	<10	$ 900,000.00
2013	Parking Panda	Collaborative Consumption	Data Utility	Data Access and Transparency	Informational	Decision Making/Service Providing	Baltimore, MD	MD	11+	$ 4,700,000.00
2007	Peak Democracy	Community Organizing	Resident Feedback	Community Action and Crowdsourcing	Interactive	Decision Making/Service Providing	Berkeley, CA	CA	<10	$ -
2012	Placemeter	Government Data	Data Utility	Data Access and Transparency	Informational	Decision Making/Service Providing	New York, NY	NY	11+	$ 9,443,000.00
2010	PlaceSpeak	Community Organizing	Community Organizing	Community Action and Crowdsourcing	Interactive	Information Sharing/Collection/Monitoring	Vancouver, BC	BC	11+	$ 1,300,000.00
2008	Poll Everywhere	Community Organizing	Voting	Voting and Legislative Process	Interactive	Decision Making/Service Providing	San Francisco, CA	CA	11+	$ 20,000.00
2014	Remix	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	San Francisco, CA	CA	11+	$ 120,000.00
2008	Romulus	Government Data	Data Utility	Data Access and Transparency	Informational	Decision Making/Service Providing	Cambridge MA	MA	11+	$ 175,000,000.00
2014	Sidewalk Labs (Flow)	Government Data	Data Utility	Data Access and Transparency	Utility & Productivity	Decision Making/Service Providing	New York, NY	NY	11+	$ -
2014	Simpolfy	Community Organizing	Voting	Voting and Legislative Process	Interactive	Decision Making/Service Providing	Seattle, WA	WA	<10	$ 41,000.00
2009	Slack	Social Network	Neighborhood Forums	Community Action and Crowdsourcing	Utility & Productivity	Decision Making/Service Providing	San Francisco, CA	CA	500+	$ 540,000,000.00
2011	Snapchat	Social Network	Community Action	Resident Feedback	Interactive	Information Sharing/Collection/Monitoring	Los Angeles, CA	CA	1000+	$ 25,000,000,000.00
2011	SnapSense	Government Data	Data Access and Transparency	Data Access and Transparency	Informational	Information Sharing/Collection/Monitoring	Chicago, IL	IL	<10	$ 10,000.00
2007	Socrata	Government Data	Open Government	Public Decisionmaking	Utility & Productivity	Information Sharing/Collection/Monitoring	Seattle, WA	WA	100+	$ 54,500,000.00
2011	TransparaGov	Government Data	Open Government	Data Access and Transparency	Informational	Information Sharing/Collection/Monitoring	Washington, DC	DC	11+	$ -
2009	Uber	Collaborative Consumption	Peer-to-Peer Sharing	Community Action and Crowdsourcing	Wayfinding	Decision Making/Service Providing	San Francisco, CA	CA	5000+	$ 66,000,000,000.00
2014	Walc	Government Data	Visualization and Mapping	Visualization and Mapping	Utility & Productivity	Visualization	New York, NY	NY	<10	$ -
2007	Waze	Collaborative Consumption	Information Crowdsourcing	Community Action and Crowdsourcing	Wayfinding	Decision Making/Service Providing	Palo Alto, CA	CA	50+	$ 67,000,000.00

Appendix B

Respondent #1:

Q1: How do you feel about the increasing use of technology in the planning field?
Technology can be beneficial if backed by sufficient funding and staff. Tech should be supplemental to human analysis, but should not serve as a wholesale replacement, due to the complexities of the real world that are difficult to quantify into a formula.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
yes, by making more information available online, through websites, or by allowing access to permit tracking systems.

Q3: How do you think planners and citizens respond to the use of planning technology?
mixed bag, due to personal preference of the individual. technology is not so great at responding to follow-up questions.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
yes, however, it's unclear if planning tech. is a viable option in the short-term. maybe when tech. improves in the future, with better innovation, it can be better incorporated into planning work. algorithms cannot currently account for the complexities and constant change of the real world and the specifics of an individual/neighborhood situation.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
online GIS based zoning maps. allows public access, easily, to the most pertinent information in planning. and of course computers for daily communication (goes without saying, I suppose).

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
tech. overall is useful, but could be implemented better. ease of design of tech. systems (permit tracking systems/online GIS/ etc.) could be improved. some tech that should be phased out include CD's and Fax machines, due to impacts on environment, versus digital formats.

Q7: What type of planning technology would you like to see more available/affordable? Why?
a kindle-like device which can display full-size architectural plans. saves paper and is more organized and more convenient.

Q8: Do you have any new ideas for planning technology?
software that can accurately check plans against city development standards, such as maximum height and setbacks.

Appendix B

Respondent #2:

Q1: How do you feel about the increasing use of technology in the planning field?
Mixed; it is helpful but also becomes a crutch and a dependency

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes, rolling out web-based permit database, archives, and service counter functions

Q3: How do you think planners and citizens respond to the use of planning technology?
Those with the education and finance can take advantage of it but others can be left behind in the digital divide

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
Yes, it is a surcharge on all permit fees - it does seem viable because technology is advancing and the public sector needs to keep up

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Online customer functions and street views to eliminate auto visits

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
None

Q7: What type of planning technology would you like to see more available/affordable? Why?
Online, to spread information so that citizens are more engaged and for convenience

Q8: Do you have any new ideas for planning technology?
Not at this time.

Appendix B

Respondent #3:

Q1: How do you feel about the increasing use of technology in the planning field?
More confident about it than a few years ago.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
My planning division relies on permit tracking software, GIS, and meeting agenda management software (a program that routes staff reports, resolutions, and generates meeting agendas) every day.

Q3: How do you think planners and citizens respond to the use of planning technology?
Having permit tracking software (such as ours) allows the public to access more information online about projects in progress and lets them schedule inspections. It provides greater transparency and access for the public.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
We have added a technology fee to all permit applications to fund technology such as the software that helps us do our jobs. We always need more funding but our revenue is limited and not stable.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
We us Accela permit tracking software, Legistar agenda tracking software, GIS, and Adobe Creative Cloud suite to do design work.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
Using permit tracking software is urgently needed but the quality of the software available on the market is really problematic. The product quality and ease of implementation and use has been a challenge.

Q7: What type of planning technology would you like to see more available/affordable? Why?
Cities need help with recordkeeping. I am still amazed that no one has developed a simple software program focused on planning project management that can efficiently and inexpensively help planning departments keep track of their projects.

Q8: Do you have any new ideas for planning technology?
Nope

Appendix B

Respondent #4:

Q1: How do you feel about the increasing use of technology in the planning field?
It will promote efficiency, expand capability and boost productivity

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes. Recently updated our software to a web-based platform. Use Google/Bing Maps and GIS to access information and data.

Q3: How do you think planners and citizens respond to the use of planning technology?
Positively. for example Planners have visual access to planning locations, Citizens can remotely access permit records.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
Yes. The City of Oakland has a technology surcharge that applies to all permits in order to enhance technology. It is viable because it accumulates reserve funding for technological improvements such as updated computers, software, training, etc.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
GIS
Accela
Internet (Google/Bing Maps) Email, Teleconferencing, "QMATIC" announcing and queuing

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
There are some glitches to work out with Accela but can be worked out with right technical personnel

Q7: What type of planning technology would you like to see more available/affordable? Why?
Project Management software

Q8: Do you have any new ideas for planning technology?
Would be great to have a software that suggests standardized viable solutions to some planning inputs. For example. What kind of mixed use development is appropriate for a major thoroughfare with a context of historical buildings or a mixture of retail uses.

Appendix B

Respondent #5:

Q1: How do you feel about the increasing use of technology in the planning field?
Working for a public agency, I often find that the 'increasing use of technology in the planning field' makes information more readily available to the general public than ever before. While this can help involve communities, the platforms frequently used (e.g. Nextdoor, Facebook) are seldom moderated by the City and as a result, are often used by a few individuals to promote an agenda or spread misinformation. The public is increasingly expected to find the 'answers' to their questions online and are often frustrated when they find public agencies ill-equipped or unable to provide due to fiscal constraints.
It is also worth mentioning that as community expectations change (as they are right now) a greater emphasis will be paid by elected bodies to prioritize technology in the planning field to bear the cost(s) of implementing, and maintaining technology services at a higher level than ever before.
As an aside, your research on this point should also touch on topics such as:
1. Training (planners are increasingly needing to know more software, often times well outside skill set creating 'specializations' within the workforce... I for one, need to know some basic HTML just to be able to code/post information online).
2. Maintenance - Often times a piece of technology seems like a great idea, but no resources are allocated to train staff to use it, or time allocated to maintain it.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes, but slowly. We're trying to master the software we already have, while also 'eventually' transitioning to a new permit tracking software which will make information available to the public as it becomes available to us.

Q3: How do you think planners and citizens respond to the use of planning technology?
See response to #1.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
We're constantly seeking more funding for technology. Many cities are still have information only available in hard copy (microfilm, paper) which has yet to be scanned. The tremendous cost of transitioning these resources to even a digital realm, so they can be used by new technology, is a challenge in and of itself, and funding is a big part of that.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Every piece of technology we use is beneficial (or hopefully we wouldn't use it). My jurisdiction recently transitioned to a digital packet assembly, requiring decision making bodies to be provided ipads to review materials. This has saved a great deal of cost (paper/printing), time (assembly) and environmental damage (paper again). However, the 'smaller size' of plan distribution (when viewed on an ipad) is not often a perfect substitute for full size/paper plans.

Appendix B

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
See faults in #5.

Q7: What type of planning technology would you like to see more available/affordable? Why?
Permit tracking software that makes it easy for residents to know what is going on in their community, synced with Google maps and/or a publically available platform (which does not require the public to own/download or learn a new platform to operate).
Machines to make scanning of old records (microfilm etc.) more affordable/available as well. It only becomes more costly, each year that this effort is postponed, and it is (in most cases) already cost prohibitive.

Q8: Do you have any new ideas for planning technology?
See PeakDemocracy & OpenCounter - these ideas once implemented, and implemented well.

Appendix B

Respondent #6:

Q1: How do you feel about the increasing use of technology in the planning field?
I feel it is very important. The use of technology is important to keep pace with the pace of industry and business.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes. Our agency has recently launched a new permit tracking system that is more transparent to the public/applicants; and is more powerful with regard to tracking workflows, calculating fees, and turning around more timely reports.

Q3: How do you think planners and citizens respond to the use of planning technology?
I feel it is a positive response on both parts.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
Yes, we have made an investment of nearly $2 million in the new permit tracking systems; we are looking at additional lower level investments in tools. It is a viable option at this time because it is a strategic goal supported by the elected leadership.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Permit tracking system; GIS systems; City wide and Department specific websites for posting, sharing, and reporting to stakeholders and public

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
N/A

Q7: What type of planning technology would you like to see more available/affordable? Why?
3-D simulation tools, what-if scenario planning tools

Q8: Do you have any new ideas for planning technology?
building virtual 3-D models of a City and all of its inherent systems (drainage, traffic, topography, noise, landmarks, etc.)

Appendix B

Respondent #7:

Q1: How do you feel about the increasing use of technology in the planning field?
Its very helpful

Q2: Are you, or the organization you work in, currently working to improve its use of planning technol ogy? How?
Yes. All electronic agenda packets.

Q3: How do you think planners and citizens respond to the use of planning technology?
Very well provided they know how to utilize it.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
Yes but limited due to limited budget $$

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
All electronic agrenda packets. This saves the city about $6,000 in paper costs per year. It also saves the applicant's $1,000's of dollars in repr costs....

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
None

Q7: What type of planning technology would you like to see more available/affordable? Why?
Laptops and computers at the dais....

Q8: Do you have any new ideas for planning technology?
Not at this time

Appendix B

Respondent #8:

Q1: How do you feel about the increasing use of technology in the planning field?
How are you defining planning technology? I assume this could/would include new GIS applications, use of internet surveys such as this one? In the case of internet surveys, I think it a good way to reach a broad audience on a subject matter quickly. However, it should not be used to replace traditional community outreach methods such as going out into the community and holding meetings or conducting "pop-up" events/surveys at City special events such as weekend concert series, Harvest Festivals, and Animal Shelter Events.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
With the younger generation entering the planning profession the use of internet based technologies (Websites, Twitter, Facebook etc.) is increasing. In my organization we are perfecting its use to conduct community outreach, or to gauge a communities reaction on a particular planning issue. We will definitely continue using this type of technology and refining the manner in which we use it and interpret the results.

Q3: How do you think planners and citizens respond to the use of planning technology?
Positively. I think it creates efficiencies in the process.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
No. I think there are other higher City priorities for expenditure of taxpayers monies.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Just the ones listed earlier in the survey.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
None.

Q7: What type of planning technology would you like to see more available/affordable? Why?
None that come to mind.

Q8: Do you have any new ideas for planning technology?
No.

Appendix B

Respondent #9:

Q1: How do you feel about the increasing use of technology in the planning field?
Increasing use of technology is neither good nor bad. The use of technology to provide better data to evaluate projects and shape policy is great, the use to technology to basically overwhelm the system and as a NIMBY organizing tool has been a less positive development.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes, first in just our operations efficiency, scanning documents, reducing paper in the permit process, providing tablets for real-time information during field visits and inspections.
We are also using technology to provide better information to the public and our customers. Integrating public-side GIS to provide better online permitting, zoning inquiries, business portals, etc. We are looking at replacing traditional mailed hearing notices with a hybrid system based on web delivery.
We are also attempting to use technology to improve outreach and engagement with the community. Thus far bringing the community meeting online has not actually brought new voices in so much as it has elevated the voices of those already participating but we have not given up at finding technological tools to engage with stakeholders younger and less affluent than those that show up at traditional public meetings

Q3: How do you think planners and citizens respond to the use of planning technology?
This is impossible to generalize. In our own staff we have planners that embrace technology and others who fight any change in the workplace, the same is true with the public.
Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
We have a built-in funding source for technology, a surcharge on all permits and entitlements, that is sufficient for our needs. Our ability to make broader technology changes is limited by the citywide backbone (outdated servers, inadequate bandwidth, overly restrictive security and access policies, etc.)

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Productivity software, data visualization that shares information with the public and reduces routine-phone calls.
What we need is better and more accessible scenario planning software. Right now land-use changes must be built in GIS and then modeled, sometimes over several days, through clunky air, GHG and traffic modules. This prevent staff from taking a more iterative approach to land use planning.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
Our permit software (Hansen - infor) is outdated garbage.
We, like everyone, use MS Office for basic documents, but why does the most popular software on Earth make it so difficult to modify reports and make them look uniform without painful formatting and reformatting each time
We use ArcGIS, adobe suite, etc.

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Q7: What type of planning technology would you like to see more available/affordable? Why?
GIS based impact analysis, what does changing height and intensity do to traffic, air pollution, etc .... at the push of a button rather than at great cost

Q8: Do you have any new ideas for planning technology?
There are hundreds of public engagement platforms, none so far actually do a good job of reaching underserved communities

Appendix B

Respondent #10:

Q1: How do you feel about the increasing use of technology in the planning field?
It can be both exciting and challenging at the same time. There are usually some growing pains and adjustments when changing to a new process.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Our organization is always looking for ways to improve efficiency. An effort is made to share new ways or working and updates to processes.

Q3: How do you think planners and citizens respond to the use of planning technology?
In my experience it has been mostly favorable from planners and citizens.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
I don't in my role or position seek funding for planning technology.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
The tools we have for permit tracking and GIS data are invaluable in processing the various applications under review with the City.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
The technologies available to planning staff have been beneficial and integral in completing review and approval of planning applications.

Q7: What type of planning technology would you like to see more available/affordable? Why?
Real time aerials of the community.

Q8: Do you have any new ideas for planning technology?
None.

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Respondent #11:

Q1: How do you feel about the increasing use of technology in the planning field?
As someone whose primary responsibility is analysis and data development in a GIS environment...I am extremely enthusiastic about the increasing use of technology! It's lead to better decision making and more researched findings. I do worry that the benefit of technology is mainly found in larger, well funded departments though. I work with folks across the state, and while we have dedicated staff who specialize in a number of technologies in SLO, many smaller cities/counties lack even a single person with program familiarity. The disparity becomes more noticeable as time goes on.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Primarily improvements in efficiency, or in "leveling the field". Development of web applications hosting data mean that Planning staff doesn't have to wait 1-3 days to get a response to their queries; everyone at their own desks can have access to all available data, and ask spatial questions about distances, densities, historical permits etc.

Q3: How do you think planners and citizens respond to the use of planning technology?
I have uniformly found that people respond positively to the increased use of technology in the planning field. It's lowered the burden on members of the public, as it's far easier for them to come in to a front counter to ask questions. We can pull up (or look up) their APN on the fly, and give them district/zoning/code enforcement info from an all in one web app, rather than needing them to acquire their info for specific questions. At public meetings people are enthusiastic about the displays we generate, and many are pleased that the increased efficiency allows us to get more work done.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
We very often have to "make the case" for continued funding of some projects, but it's honestly become easier over the years. We now have examples of how the technology has improved both the quality and depth of our analysis, which has directly improved the ability to make decisions (and defend them!). While one always has to fight for their "slice of the (funding) pie", local agencies really have been positive partners in ensuring we receive the training/money/opportunities.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
As I spend ~90% of my week working in GIS, I'm obviously going to flag that as a HUGE technology that has had real, measurable impact on the quality of work that's been done. GIS staff are given the leeway to work on some interesting, far ranging projects, while Planning staff are able to ask more focused, interesting questions about potential impacts.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
While I haven't seen it used locally, I sigh when I see folks excitedly consider using Sketchup to do some sort of site analysis. I think it's just me shuddering after CRP 201/202/203...hah. I feel that almost all

the technology that's currently in use is beneficial, I wish I had something I could really call out for this question!

Q7: What type of planning technology would you like to see more available/affordable? Why?
This may seem like a silly answer, but it's something we struggle with: aerial imagery. I know that's not strictly a technology, but it's a critical component OF technology we use. It's several hundred thousand dollars to have a full overflight, and the data is maximally useful in the first 6-12 months after it's flown. Due to cost we can't refly yearly, so we're left with stagnant aerials for 3-4 years at a time. The aerials are great for use in code enforcement ("there's no permit for that new building there..."), emergency planning ("we can access the property from this street, but we can actually ID an alley entrance on that side for an ambulance as needed") and comparative accuracy analysis ("this building footprint or parcel doesn't reflect X change we can see on the aerial, put in a ticket to have that fixed"). So if I could make any critical tech tool more affordable...you bet it's the aerial.

Q8: Do you have any new ideas for planning technology?
Two answers to this. One is less tech focused (looking at the skills I'd like to see new planners have WITH technology) and one about the technology that's changing the game. Non tech specific answer: students seeking to enter the Planning profession need to be exposed to technology in a more intense, hands on way leading up to their graduation. When hiring, we're more and more looking for Planners who bring not only the theory they learned about the profession, but actual skills and experience with GIS, graphic design programs, and statistical analysis. While none of them will be expected to dive in and do a site analysis on their first day, the concepts need to be fresh in their minds to stay competitive. And a more technology focused answer: Web apps are the wave of the future with Planning; giving all Planners access to data at their desk, to freely research and analyze as needed will lead to such better (and faster) work. But beyond that, providing the same web app tools for the public. People can get their answers without needing to come into the office, and will gain a better understanding of where they live. We're working towards that locally, it's just going to be such a challenge for smaller, less funded cities and counties.

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Respondent #12:

Q1: How do you feel about the increasing use of technology in the planning field?
I think that the increased use of technology in planning has made it easier to track trends in the field (population growth, vehicle trips, etc.), which allows planners' analysis to be more precise and well supported. In the case of community engagement, technology in the form of web based surveys has become increasingly common to reach out to the citizenry. In this case, it is important for planners to ensure that all methods of remain accessible to all demographics, including those who are less likely to take a web survey (for example).
To summarize, technology has allowed planning to become more of a precise science, but creates the risk that planning becomes inaccessible to the public.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Not that I am aware of.

Q3: How do you think planners and citizens respond to the use of planning technology?
I think planners are eager to make use of new technologies, but citizens may view some of these technologies as making the planning process less transparent.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
Not that I am aware of.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
My organization uses a system to electronically transmit building and grading plans from applicant to planner and vice versa. This system conserves paper and makes the planning process marginally faster, but has technical problems of its own.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
Respondent skipped this question

Q7: What type of planning technology would you like to see more available/affordable? Why?
I would like to see municipalities work with firms developing self-driving vehicles.

Q8: Do you have any new ideas for planning technology?
Respondent skipped this question

Appendix B

Respondent #13:

Q1: How do you feel about the increasing use of technology in the planning field?
I think it helps provide the public with useful tools so they can more readily access city information.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes. We are looking at on-line plan submittal.

Q3: How do you think planners and citizens respond to the use of planning technology?
I think most planners embrace technology but want to be sure the face-to-face customer service aspect is still there.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
We have a 3% technology surcharge on land use applications which help support planning technology tools.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Internet access to Comprehensive Plans, Zoning Codes, Studies, etc. GIS for city maps. Electronic plan review which cuts down on paper usage and decreases vehicle trips to City Hall.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
None.

Q7: What type of planning technology would you like to see more available/affordable? Why?
Not sure.

Q8: Do you have any new ideas for planning technology?
Not at this time.

Appendix B

Respondent #14:

Q1: How do you feel about the increasing use of technology in the planning field?
The use of technology in the Planning field will allow future Planners to plan better communities. The use of technology will increase productivity while providing citizen/applicants engagement in the process. Additionally, providing better designed communities based on sustainable and connected development.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Our organization has implemented a Development Services software system that provides access to a plicants and contractors with real time status and inspection information. Additionally, new enhancements to the GIS have been implemented.

Q3: How do you think planners and citizens respond to the use of planning technology?
All will adjust in time. We live in a world now where the internet is so much a part of our lives that the business community both private and government will have to step up if they want to be successful. The use of GIS will play a major role in planning.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
I hope so. The private sector may advance quicker than government due to more resources.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Electronic plan review and case tracking. Both provide information readily available to applicants and staff, providing customer service. Enhanced GIS with various layers of data.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
Respondent skipped this question

Q7: What type of planning technology would you like to see more available/affordable? Why?
Respondent skipped this question

Q8: Do you have any new ideas for planning technology?
Respondent skipped this question

Appendix B

Respondent #15:

Q1: How do you feel about the increasing use of technology in the planning field?
I think it's necessary to meet changing customer and community needs.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes. We are using a number of new tools including an online engagement platform to collect community feedback without the need to attend meetings.

Q3: How do you think planners and citizens respond to the use of planning technology?
Planners can see it as more work. Some citizens are concerned with the veracity of tools.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
We are first making best use of the technology we have given a resource constrained environment.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Peak Democracy for the previously noted engagement platform.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
Outdated permit tracking systems.

Q7: What type of planning technology would you like to see more available/affordable? Why?
Portals for online submittal and tracking.

Q8: Do you have any new ideas for planning technology?
Yes.

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Respondent #16:

Q1: How do you feel about the increasing use of technology in the planning field?
An increasing use of technology is required in order to maintain or improve the level of efficiency in the planning process.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
My company doesn't directly work to improve the use of planning technology, but by working for many client cities we can see what technologies different cities are using, and recommend their use to other cities when needed.

Q3: How do you think planners and citizens respond to the use of planning technology?
Planners respond well when the technology isn't redundant, but they do not always respond well to m nor or non-intuitive changes and upgrades. Citizens respond well to anything that increases the information available to them, such as a public interface to view proposed project plans as pdfs and information regarding where projects are in the planning process.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
I work for a private company, but the agencies we staff are generally looking to have increased funding for planning technology. Especially in the Bay Area it's expected to have an up-to-date computer system, and some cities are due for an upgrade and others already have the funding to stay on the new trends.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
I work in current planning, so the technology I use isn't really all that new. We use GIST, which for planners is more or less an interactive zoning map we use to get parcel and zoning information. For the public there is a program called BuildingEye some cities including Palo Alto are using to more easily give information about current planning projects to the public. It's also nice when the online zoning code is easily keyword searchable, for some cities it does not work very efficiently.
Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?

I do not have any specific examples, but in general something that is difficult to use would not be well received. Planners want to use technology that will make their job faster and easier, some record-keeping programs can be tedious to update.
Q7: What type of planning technology would you like to see more available/affordable? Why?
I would want more technology that makes plans available to the public to be more available, because it would get the public more involved with the planning process.

Q8: Do you have any new ideas for planning technology?
Unfortunately no.

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Respondent #17:

Q1: How do you feel about the increasing use of technology in the planning field?
I embrace new tools that would be effective in making my job more efficient.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes. I am a big proponent of using chat technology to foster collaboration amongst colleagues. I also support the use of cloud saving services like Box. E-mail, in my opinion, is over- and misused.

Q3: How do you think planners and citizens respond to the use of planning technology?
There is definitely a learning curve involved when adopting new technology. Some people are early adopters while others are late to embrace it. There needs to be a transition and a back-up in case you have to fall back on legacy technology.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
We try to stay ahead of the curve, especially if we see a return in value on the investment.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
We use communications technology like Skype and Slack. We also use Box. Planning is broad, but these technologies help with information and collaboration.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
Respondent skipped this question

Q7: What type of planning technology would you like to see more available/affordable? Why?
More mapping tools could become available to the public that would result in fewer interactions with staff planners. This would free up time to conduct other matters of business.

Q8: Do you have any new ideas for planning technology?
Respondent skipped this question

Appendix B

Respondent #18:

Q1: How do you feel about the increasing use of technology in the planning field?
Good. Anything that makes my job easier without increasing administrative time would be a good thing.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes, though it's not technology geared towards planners per se. We're trying to improve communication among staff by using tools like Slack and having more simplified doc management systems like Box.

Q3: How do you think planners and citizens respond to the use of planning technology?
The under 50 planners and citizens are probably pretty good about it since to a fair extent they've grown up with it. I'm not sure how well the older generation would respond.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
I'm not sure. I'm at a more junior level, so I'm not sure what the long term plans are in my organization.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
Again, it's not planning technology, but it's technology that helps us do our jobs better. Slack is good because it gives us opportunities to have quick exchanges without bogging down our e-mail inboxes. Box is excellent because you can work directly in the document and the changes automatically update while saving older versions so you never worry about losing anything.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
Respondent skipped this question

Q7: What type of planning technology would you like to see more available/affordable? Why?
Respondent skipped this question

Q8: Do you have any new ideas for planning technology?
Respondent skipped this question

Appendix B

Respondent #19:

Q1: How do you feel about the increasing use of technology in the planning field?
I think it is a great opportunity to increase transparency and public engagement, but also a hurdle for smaller, less affluent communities.

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Yes. working to implement citizen access to online permitting. Looking at increased public engagement through City website. Utilizing GIS for neighborhood mapping, etc.

Q3: How do you think planners and citizens respond to the use of planning technology?
I think planners are typically more willing to embrace it, while citizens are initially hesitant, but utilize once the benefits are realized.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
I would like to, but we are facing budget gaps for non planning related reasons so we wil increase funding as we can, but will likely continue to be working within our means.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
GIS definitely. People are visual beings, so being able to graphically depict things on a map is incredibly helpful to get community buy in

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
Non, budget contraints require us to trim out what isn't working.

Q7: What type of planning technology would you like to see more available/affordable? Why?
Citizen centered mapping technologies.

Q8: Do you have any new ideas for planning technology?
I wish I did.

Appendix B

Respondent #20:

Q1: How do you feel about the increasing use of technology in the planning field?
I believe that increasing use of technology is important in today's society. It allows planners the opportunity to be on the same page with residents and the general public that we serve. Increased technology primarily allows for quicker response times and more interaction between citizens, developers and planning agencies

Q2: Are you, or the organization you work in, currently working to improve its use of planning technology? How?
Two important tools used in the Planning field are Geographic Information Systems (GIS) for mapping and an interactive project permitting and tracking system. The City has continually upgraded our GIS system by providing and using the most updated technology on the market with the allowance for public access on the City's website. The City of Moreno Valley is in the process of upgrading our interactive project permitting and tracking system to allow public and agency interaction in submitting planning applications and tracking active permits.

Q3: How do you think planners and citizens respond to the use of planning technology?
I believe that most citizens would welcome planning technology use in their communities. Technology and websites are important sources of information for residents in a community. An updated website can provide vital information on public hearings, projects approved and important new services in a community. In addition, GIS access and electronic permit tracking/submittal allows developers and local citizens the opportunity for quick retrieval of information and easy submittal of project applications. On the other hand, there will be some push back by older residents that are not technologically savvy or have limited computer and technology skills. Therefore I believe that with the incorporation of increased technology, an agency would still need to provide office assistance with informed Planning staff to answer questions and allow for in-person project submittals.

Q4: Do you, or the organization you work for, seek to increase agency funding for planning technology? Does it seem like a viable option? Why?
Although I am not directly involved in budget review, the City of Moreno Valley has continually allocated additional monies in the budget for upgraded technologies. This increased technology funding provides a viable option/opportunity as it allows for valuable information dissemination and technology upgrades to be provided to the public. Monies allocated for technology upgrades also keeps the planning permit process moving and allows a smooth transition and working relationship between a governmental agency and the public. The applicant is held accountable for submittal of necessary application materials and the planner is held accountable for processing applications in a timely manner. Everything is accessible and provided in plain view to the customer.

Q5: What types of planning technology is your organization using that you feel are beneficial? Why?
The two items mentioned in Item 2 are very important in moving technology forward in the City of Moreno Valley. A recently upgraded GIS system with allowance for public access provides the custom-

er necessary planning information such as location of environmental constraints, land use data, zoning, roadway network details, and school locations in their community. An upgraded interactive project permitting and tracking system scheduled to go live before the end of the year will provide submittal of planning applications electronically and extend an opportunity for the public and agencies to research and track active development permits.

Q6: What types of planning technology is your organization using that you feel are not beneficial? Why?
I am not aware of any planning technology the City of Moreno Valley uses that is not beneficial to planners, the Planning Division, developers or the local public.

Q7: What type of planning technology would you like to see more available/affordable? Why?
I would like to see more technology interaction and availability between local agencies in relation to project review and approval. Added technology in the advance planning field with interagency review would be helpful and provide a better understanding of project location and project impacts from adjacent jurisdictions. This could include links/sites between local agencies that assists in planning coordination and interaction and provides Notices of Preparation (NOP's) and Draft Environmental Impact Reports (DEIR's) quickly and in the allocated time to adjacent agencies.

Q8: Do you have any new ideas for planning technology?
The development of a well-defined planning data repository between local, state and federal agencies would be a helpful resource with coordination of interagency planning and permitting. The interaction between agencies responsible for review and approval of planning related items could assist in speeding up the approval process of necessary state and federal permits and assist developers and planners alike with necessary coordination between agencies responsible for the review and approval of development and environmental permits.

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